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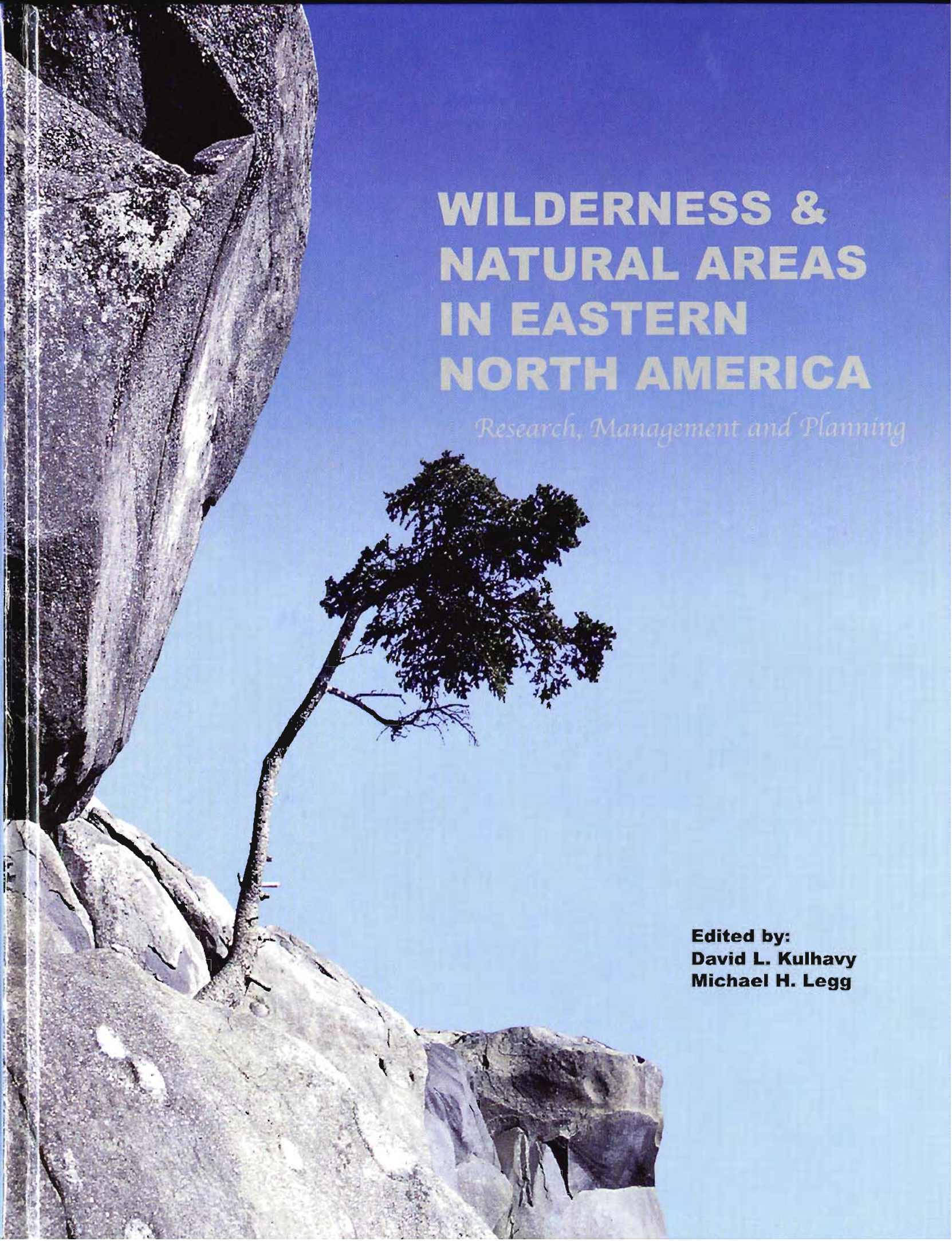
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WILDERNESS & NATURAL AREAS IN EASTERN NORTH AMERICA

Research, Management and Planning

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Landtype and Vegetative Classification of the Sipsey Wilderness, Alabama

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Abstract: The Sipsey Wilderness was established in 1975 and expanded in 1988 to 11812 hectares. Prior to and since establishment, no classification of either landtypes or existing vegetation was performed to provide baseline information on present wilderness communities and future changes in community structure as the result of natural processes or anthropogenic impacts. 220 different stands were identified through existing aerial photos and topographic maps, and plots within each stand established and measured for landtypes, understory vegetation and overstory vegetation. Descriptions of landtypes and vegetative communities are reported.

Keywords: Sipsey Wilderness, landtype classification, vegetation communities

The proper management of any natural resource requires effective analysis of data regarding that resource. This is true regardless of whether it is a pine plantation, wilderness area, recreation site, wildlife resource or any of the varied uses for natural resources. It is therefore imperative that baseline data be collected so that changes over time in that resource may be evaluated, and the source of the changes determined. On the 11812 hectare Sipsey Wilderness, no such baseline data are available.

The area that is now the Sipsey Wilderness has been managed under varying management strategies across time and landscape, including farming, logging, and homesteading, and contains areas of Native American or archeological importance, as well as areas of relatively low disturbance. Because of the variety of past use, no baseline information of the entire area from the same time has been available. The objectives of this study were to evaluate the vegetative communities on the Sipsey Wilderness, and to obtain baseline information on the status of the ecological communities found within the wilderness.

METHODS

Two sets of aerial photographs covering the Sipsey Wilderness (leaf-on color IR and leaf-off natural color) were used for a preliminary

delineation of the overstory communities. Initial delineation was based on obvious changes in overstory vegetation (conifer vs. hardwood); the next level of delineation was based on changes in topography that generally results in changes in vegetation not discernible in aerial photos. A total of 220 different stands were delineated and plot location within each stand was randomly determined. Of the 220 plots, 170 were sampled for vegetation composition; the remaining 50 plots are classified into vegetation communities based on similar landforms and apparent vegetation in the aerial photos, but were not confirmed on the ground.

Each plot was 1000 m² (0.1 ha) and subdivided into 10 subplots measuring 100 m² (0.01 ha). Most plots were oriented 2 subplots by 5 subplots; a few were laid out 1 x 10 subplots to conform to landform boundaries and tentative vegetation community boundaries. All plots were marked with rebar in each plot corner and identified with plot and subplot number. Plots did not straddle vegetation types, and as far as could be determined, subplots did not straddle soil map units.

During the 1994 growing season all 170 plots were visited. One third of the plots were sampled in the spring, one third in the summer, and the remaining third were sampled in both spring and summer in an effort to collect data on within-season understory changes. Three

subplots within each plot were randomly chosen for sampling; one subplot selected was intensively sampled (understory, overstory and soil), while the remaining two subplots were only sampled for overstory.

Each herb, shrub and tree species within each subplot was recorded in one or more of the following vegetation layers: 0-1m, 1-3m, 3-12m, and 12+m. Each species found in a vegetation layer less than 12m tall was also classified into the following cover classes: trace, 1-2%, 2-5%, 6-10%, 11-25%, 26-50%, 51-75%, 76-95% and 96-100%. All trees greater than 10 cm at dbh were measured and classified within 5 cm diameter classes, species and crown position (intermediate, co-dominant, dominant).

A subjective measure of the relative abundance of the lichen growth forms (fruticose, foliose, crustose, Usnea-like and Cladonia/Cladina) were made in each plot. Each of the five lichen forms were classified for the whole plot based on the speed with which they were found as either Abundant, Frequent, Sparse, Rare or Absent.

On all plots sampled, the landform/expected mapped soil series relationship was confirmed.

RESULTS AND DISCUSSION

Vegetative Communities Each stand visited was classified using three methods: Landtype Association Classification (Smalley 1979), SAF Cover Type Classification (Eyre 1980) and Ecological Community Classification (Allerd et al. 1994). A total of ten different landtypes were identified. Six of these were identified on only 1-3 plots over the entire wilderness, while Landtype #1 (Narrow Sandstone Ridges and Convex Upper Slopes) was found on 117 plots. Thirteen confirmed SAF Cover Types were found, as well as an additional three types that did not fit current SAF classification. These SAF Cover Types closely correlated with the Ecological Classification Units, with nine confirmed types and an additional 5 new types.

Grouping these vegetative communities into similar types show some relationships between landtypes and the supported communities (Table 1). Fifty-three percent of the sample's plots were classified as one of the various oak communities, while another 24% were pine/hardwood community types. These community types were found on seven of the landtypes, with most being found on landtypes 1 and 10, representing 81% of the visited

stands. An additional 537 ha (5% of the Sipsey) was classified as oak or oak/pine mix, although not visited. A majority of the pine stands, many of which are plantations established prior to wilderness designation, are also found on landtype 1. There is little reason to expect these pine stands not to succeed toward a pine/hardwood community and then become one of the oak communities already established on similar sites.

Most of remaining landtypes supported single community types, often only once or twice. Of these, landtype 12 supported 5 stands that were classified as other hardwood. This landtype has a north aspect, and supports more mexic communities such as beech-sugar maple.

The wide distribution of oak community types across the heavily dissected landscape associated with the Sipsey Wilderness, and the apparent successional trend of the pine/hardwood and pine communities toward these same oak types, reflects the highly plastic adaptability of these oak species to varied site conditions. The lack of community diversity also highlights the small impact the dissected topography has on community structure in this region. Further studies of the understory component should clarify the relationship of topography with these communities.

Landtype Descriptions

Landtype 1: Narrow Ridges and Convex Upper Slopes. Shallow to moderately deep soils on gently sloping to steep, narrow winding ridgetops and adjacent convex slopes. 0-40% slopes. Usually no wider than 250 feet. Well drained to excessively drained. Low water supply and moderately low soil fertility. Was found on 117 of 170 plots.

Landtype 3: Broad Ridges-North Aspect. Moderately deep to deep soils on nearly level to steep north facing portions of broad ridgetops and adjoining convex upper slopes. 6-35% slopes. Well drained to moderately well drained. Medium soil water supply and moderately low to low soil fertility. Was found on 1 of 170 plots.

Landtype 4: Broad Ridges-South Aspect. Moderately deep to deep, silty and clayey soils on nearly level to steep south-facing broad ridgetops and adjoining upper slopes. 6-35% slopes. 20 inches to 5 feet to bedrock. Well-drained. Medium to low water supply and moderate to low soil fertility was found on 2 of 170 plots.

Table 1. Groupings of Vegetative Communities Within Landscape Types. Pines= Loblolly and Virginia Pine Communities; Pine/Hardwoods = Loblolly Pine/Hardwood and Virginia Pine/Oak Communities; Oaks = Red Oak, White Oak, Chestnut Oak and White/Black/Northern red Oak Communities; Other Conifers = Eastern Redcedar and Eastern Hemlock Communities; Other Hardwoods = Bigleaf Magnolia/Blackgum, Red maple, Hickory Transition and Beech-Sugar Maple Communities; N. O. = communities where no overstory was found. See text for descriptions of communities and landtypes.

Landtype No.	Pines	Pines/ Hardwood	Oaks	Other Conifers	Other Hardwoods	N. O.	Total
1	15	29	63	3	5	2	117
3		3					3
5			2				2
6	1	1			1		3
7				1			1
8					3		3
10	1	3	18	1	1		24
12		2	5		5		12
13		3	4		2		9
Total	17	41	92	5	17	2	174

Landtype 5: North Slopes. Shallow to moderately deep soils on north-facing linear to nearly linear mid-slopes. 20-40 inches to bedrock. Well drained. High to medium soil moisture supply with some subsurface flow and moderately low to low soil fertility. Was on 2 plots of 170.

Landtype 6: South Slopes. Shallow to moderately deep soils on south-facing linear to nearly linear mid-slopes. 20-40 inches to bedrock. Well drained. Medium to low soil moisture supply with low to low soil fertility. Was on 3 plots of 170.

Landtype 7: Sandstone Glades, Rock Outcrops and Plateau Edges. Small to moderately large areas of shallow soils and bare rock on nearly level to steep ridgetops. 5% or less rock slope. Very shallow soils. Well-drained to excessively drained. Very low water supply usual-this plot may have had water retention capabilities, and seepage is common in wet weather. Very low soil fertility. The 1 plot of 170 supported Eastern Hemlock, indicative of better moisture than usual for this type.

Landtype 8: Lower Slopes, Terraces and Stream bottoms with good drainage. Deep soils with good drainage on level to strongly sloping lower slopes and heads of hollows at top of ridges. 0-15% slopes. 4-11 feet or more to bedrock. Well drained to moderately well drained, high soil moisture supply with subsurface flow and moderate soil fertility. 3 of 170 plots.

Landtype 10: Sandstone Escarpments,

Talus slopes and benches, North Aspect. Deep to very deep soils on gently sloping to very steep upper slopes. 2-70% slopes. 40 inches to 5+ feet to bedrock. Well-drained soils with very high soil moisture and moderate to low soil fertility. 24 of 170 plots.

Landtype 12: Lower Slopes, Benches and Spur Ridges-North Aspect. Shallow to very deep soils on gently sloping to very steep lower slopes. 2-75% slopes. A few inches to 10+ feet to bedrock. Moderately well-drained to well-drained soils with low soil moisture and moderately low fertility. 12 of 170 plots.

Landtype 13: Lower Slopes, Benches and Spur Ridges-South Aspect. Shallow to very deep soils on gently sloping to very steep lower slopes. 2-75% slopes. A few inches to 10+ feet to bedrock. Moderately well-drained to well-drained soils with low soil moisture and low to very low fertility. 9 of 170 plots.

SAF Cover Type

Classification Descriptions

23 Eastern Hemlock [*Tsuga canadensis* (L.) Carr]: Pure or provides majority of stocking. Common tree associates in the south include northern red oak, white oak, yellow-poplar, red spruce, basswood, black cherry, red maple and white ash. Variety of shrub and herbaceous species associated. Not common in south, but may be found in isolated coves and cool, moist sites.

44 Chestnut Oak (*Quercus prinus* L.): Pure or provides majority of stocking

usually on dry sites. Common associates include northern and southern red oaks, black, post, scarlet and white oak; hickories, yellow-poplar, sweetgum, black gum, red and sugar maples, eastern redcedar, virginia, shortleaf and loblolly pines. Variety of shrub and herbaceous species associated. Usually dry sites, often ridgetops.

46 Eastern Redcedar (*Juniperus virginiana* L.): Pure or provides majority of stocking, often on dry uplands, abandoned fields and in glades. Associates vary greatly across range of species, which is widest of eastern conifers. Commonly found on shallow soils and limestone outcroppings. Variety of shrub and herbaceous species associated, but tend to be fewer in numbers than on many other sites.

52 White Oak-Black Oak-Northern Red Oak (*Quercus alba* L., *Q. velutina* Lam., *Q. rubra* L.): Together comprise a majority of stocking. Variety of other oaks and hickories commonly associated. This was previously named white oak-red oak-hickory (see hickory transition below). Variety of shrub and herbaceous species associated. This type is subclimax to climax, with the more moist sites supported other climax vegetation.

53 White Oak (*Quercus alba* L.): White oak is pure. Up to 20% of stocking is comprised of a variety of oaks and hickories, black gum, yellow-poplar, maples, white ash. Understory trees include dogwood, sassafras and sourwood. Variety of shrub and herbaceous species associated. Moderately dry sites, with moisture determining associated species.

55 Northern Red Oak (*Q. rubra* L.): Comprises majority of stocking, may occur in pure stands. Associates vary with site and geographic locale. In the south occurrence is spotty. Variety of shrub and herbaceous species associated.

59 Yellow-Poplar-White Oak-Northern Red Oak (*Liriodendron tulipifera* L., *Quercus alba* L., *Q. rubra* L.): These species constitute majority of stocking. Usually associated with coves, but can extend onto moist sites on east and north facing slopes. Variety of shrub and herbaceous species associated. Late successional community normally associated with lack of fire, which can eliminate the yellow-poplar.

60 Beech-Sugar Maple (*Fagus grandifolia* Ehrh., *Acer saccharum* Marsh): Together constitute majority of stocking, but can include a variety of overstory

and understory species dependent on the region and site. Late successional community associated with coves. Found in small patches in south.

78 Virginia pine-Oak (*Pinus virginiana* Mill., *Quercus* spp. L.): Virginia pine and variety of oaks make up majority of stocking. Associated species also include red maple, yellow-poplar, shortleaf pine, dogwood, and hickories. Variety of shrub and herbaceous species associated. Usually on old fields but also on other upland sites.

79 Virginia Pine: Pure stands or majority of stocking. Associates vary with geographic locale, but in this region include shortleaf pine, oaks, hickories and eastern redcedar. Variety of shrub and herbaceous species associated. Pioneer species that is often found on disturbed sites.

81 Loblolly Pine (*Pinus taeda* L.): Pure stands or mix with other species but still is majority of stocking. Sweetgum is often most common. Other pines, oaks, hickories and sassafras also found. Variety of shrub and herbaceous species associated. Tends to be temporary due to succession pressures. May be old plantations.

82 Loblolly Pine-Hardwood: Loblolly pine is dominant but not more than 20% of stocking with mixture of hardwoods. Hardwoods vary with moisture conditions found throughout range of loblolly pine, including oaks, hickories, maples and elms. Variety of shrub and herbaceous species associated. Widespread but sporadic.

108 Red Maple (*Acer rubrum* L.): Comprises majority of stocking. Associates are diverse, but in this region include oaks, sweetgum, yellow-poplar, loblolly pine and virginia pine. Variety of shrub and herbaceous species associated. Rare in south, but can occur in small areas. May be increasing in area due to disturbances removing other associates that were dominant species.

These three cover types are not classified by Eyre (1980). We have presented them as cover types so that the entire Sipsey is represented, and to highlight some of the unique vegetative communities found there.

Hickory Transition (*Carya* spp. Nutt.): These cover types are dominated by various hickories, with no identifiable successional trend following below them. There is a mix of hardwood species, including red maple, oaks, and various understory trees.

Where these stands are going successional is impossible to determine at this time.

No Overstory: These two sites represent two unique conditions within the Sipsey. They appeared as identifiable stands from the aerial photos. Plot 150 is an old CCC camp. It is currently dominated by grasses and shrubs, with small loblolly pines scattered throughout the stand. Plot 208 is an old wildlife opening, probably an old feedplot, with no trees species within the stand.

Bigleaf Magnolia-Black Gum (*Magnolia macrophylla* Michx., *Nyssa sylvatica* Marsh.): This is a unique cover type that does not appear in any forestry literature we could find. There is one stand (plot 203) that is dominated by Bigleaf Magnolia and Black Gum, both in the overstory and the smaller size classes. It is obviously a transitional stand that should develop into a more traditional (probably oak) cover type, but at this time could not be classified in any other type.

Ecological Classification and Vegetative Community Descriptions

The overall community classification and descriptions used in this project are based on the system developed by the Nature Conservancy, along with others, for the Southeastern United States (Allard et al. 1994). Descriptions and identifications are from documentation provided by the USFS in Montgomery. Where documentation does not exist to support communities found within the Sipsey, we developed similar descriptions. These latter stands are the same stands described above as not documented within the SAF Cover Types.

***Pinus taeda* Upland Forest Alliance:** This type was found on 7 plots and was equivalent to Cover Type 81 (Loblolly Pine). Total area for this type was 430 hectares. This type is successional following harvesting and planting, and on the Sipsey represents old plantations (but younger than loblolly pine-hardwood stands) currently dominated by Loblolly pine. Landtypes were 1,10,11, with five being on 1, Narrow Sandstone Ridges and Convex Upper Slopes. We are assuming these types will succeed to the various oak-dominated communities also found on these landtypes.

***Fagus grandifolia* -*Acer saccharum*-*Liriodendron tulipifera* Forest Alliance:** This type was found on 7 plots and was equivalent to Cover Type 60 (Beech-Sugar Maple). Total area for this type was 958

hectares. This is a deep soil forest type, usually mesophytic forests in coves and north or east facing slopes. These types are late-successional, climax (or near climax) types, and reflect areas where little disturbance has occurred. Landtypes were 1,10,12 and 13.

***Quercus alba*-*Quercus (coccinea, velutina)*-*Carya (alba, glabra)* Forest Alliance:** This type was found on 70 plots and was equivalent to Cover Type 52 (White Oak-Black Oak-Northern Red Oak, 66 plots) and 53 (White Oak). Total area for this type was 2567 hectares. This is possibly where the plots dominated by hickories (see below) will succeed to over time. These are usually dry-site oak-hickory forests in the interior uplands, and are obviously a major part of the Sipsey Wilderness. Landtypes were 1,5,10,12 and 13, with 50 being on landtype 1, Narrow Sandstone Ridges and Convex Upper Slopes.

***Quercus prinus*-*Quercus (alba, falcata, velutina)*-*Carya (alba, glabra)* Forest Alliance:** This type was found on 19 plots and was equivalent to Cover Type 44 (Chestnut Oak). Total area for this type was 1493 hectares. This type represented many of the drier chestnut oak-mixed species stands within the Sipsey, and may have been dominated by Chestnut (*Castanea dentata* (Marsh.) Borkh.) in the past. Shagbark hickory (*Carya ovata* (Mill.) K. Koch) was also a common associate. Understory often dominated by various shrub species. Landtypes were 1,10,12 and 13, with 12 on landtype 1.

***Quercus rubra* Forest Alliance:** This type was found once in the Sipsey and covered 564 hectares. It was the same as Cover Type 55 (Northern Red Oak). This type was not listed as occurring on the Bankhead, but did reflect all of the characteristics of such a type. It was found on landtype 1.

***Pinus taeda*-*Quercus (alba, falcata, stellata)* Forest Alliance:** This type was found on 27 plots and was equivalent to Cover Type 82 (Loblolly Pine-Hardwood). Total area for this type was 1790 hectares. This type was not listed as occurring on the Bankhead, but appears to be a common type. Should be considered transitional type with the loblolly pine being replaced successional by the oaks and other hardwoods, and may be the same as the *Pinus taeda* Upland Forest Alliance described above, but farther along successional. Landtypes were 1,4,6,10 and 12, with 18 on landtype 1.

Juniperus virginiana-Fraxinus americana-Quercus muehlenbergii Forest Alliance: This type was found on 1 plot (461 hectares) on Landtype 1 and was equivalent to Cover Type 46 (Eastern Redcedar). This was the only stand dominated by Eastern Redcedar, and was found on a site with shallow soils with limestone outcropping. We were surprised we found only one site. Many areas of the Sipsey supported Eastern Redcedar, but those sites had not been disturbed for a period of time, and hardwood succession had taken place, usually dominating these stands.

Pinus virginia-Quercus (alba, stellata, falcata, velutina) Forest Alliance: This type was found on 27 plots and was equivalent to Cover Types 78 (Virginia Pine-Oak) and 79 (Virginia Pine). Total area for this type was 1298 hectares. This type represented drier sites, often disturbed, where virginia pine was maintaining a strong presence. With fire exclusion, these stands may succeed towards oak dominated types, but weather disturbances will still maintain this type within the Sipsey. Landtypes were 1,3,6,10 and 13, with 21 on landtype 1.

Tsuga canadensis-Liriodendron tulipifera Upland Forest Alliance: This type was found on 4 plots and was equivalent to Cover Type 23 (Eastern Hemlock), covering 266 hectares. These were often found in coves, and represented late successional communities. Landtypes were 1,7 and 10, with 7 and 10 representing the more traditional type of cove sites associated with Eastern Hemlock. The two plots on Landtype 1 were also on cooler sites and appeared to be relatively undisturbed areas within the Sipsey Wilderness.

The following did not fit any of the current classified communities described by the Nature Conservancy.

A: This was the hickory transition as described in the SAF Cover Type descriptions above. Various hickories were dominating the overstory with a few oaks, with most of the tree regeneration being beech and sugar maple. These 208 hectares may become beech-sugar maple types in the future if there is no disturbance.

B: This is the red maple type described in the SAF Cover Type, covering 603 hectares. We believe this is a transitional community, but there is no definite understory community from which to estimate future communities.

C: These are the 2 yellow-poplar-white oak-

northern red oak communities covering 89 hectares and described in the Cover Types. They do not fit any of the communities previously described, and may be isolated types only associated with the dissected landscape in the upland hardwood forests found throughout the Sipsey Wilderness.

D: These are the two plots (242 hectares) with no overstory previously described. Both have been heavily modified by human activities, and additional time must pass before a identifiable vegetative community may be found.

E: This is the unique bigleaf magnolia-black gum stand (242 hectares) found once within the Sipsey and that does not appear to be previously identified. See the cover type description above for further information.

Stands not inventoried but estimated to be of a certain community, totaled 601 hectares and broke down as: 278 ha of loblolly pine/oak, 240 ha of chestnut oak/oak; 21 ha had no overstory; 19 ha of virginia pine/oak; and 43 ha were not classified because they were located within narrow areas along cliffs/streams which made initial classification from aerial photos almost impossible and ground inventory dangerous.

Lichen Life Forms

Eleven plots, representing six landtypes, associations or SAF Cover Types, and five ecological classification types, were found supporting lichen growth. Seven of these supported rare occurrence for all growth forms, two were sparsely occurring for all growth forms, and the *Cladonia/Cladina* (C/C) growth form was found alone on two plots, once rare and the other sparsely.

Mosses

A total of 85 plots supported mosses. These plots were within eight landtypes, 12 SAF Cover Types and 11 Ecological Classification Types. No identification of specific moss species was performed. Only one plot had frequent occurrence of moss, 12 were sparse and 72 were rare. The remaining plots did not support moss at the time of the evaluation.

Soil

On every plot, the expected soil series from the soil maps and descriptions provided by the USFS was confirmed. This accuracy was a bit unexpected due to the method often utilized to survey soils across heavily forested, dissected terrain. It may be that the highly dissected nature

of the Sipsey lent itself to greater accuracy since there would be less ecotone-type transition zones in soil development in this type of topography, but would result in close correlation between topographic features and soil series.

CONCLUSION

This survey provides a great deal of information about the Sipsey Wilderness. Although the landscape is very dissected and diverse, there appears to be a great deal of consistency in the vegetative communities. Over time, current human-imposed conditions such as old plantations and clearings will evolve into the type of stands found on the more remote areas of the Sipsey. The scientific data collected will provide the opportunity to investigate the community structures and successional processes associated with the little studied forests of the interior uplands.

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