

WOODLAND INTERPRETATIONS FOR MISSOURI SOILS

Introduction

Woodland suitability groups (WSG) are to be used when assisting land users in planning, installing, and maintaining forest land management systems. Each soil mapping unit in Missouri is assigned to a WSG based on productivity, the major soil limitation for forestry use, and potential native plant community.

Woodland Interpretation

The ordination system is a uniform method of labeling individual soils or groups of like soils to identify productivity potential and principal soil properties in relation to any hazards or limitations. The ordination system has three levels: class, subclass, and group. The class and subclass symbols are called ordination symbols. The three-part symbol is called a woodland suitability group. The system provides uniformity in grouping soils for interpretation.

Example:	Ordination Symbol	
	3 D 5	
	Class + Subclass + Group	
	Woodland Suitability Group	

Class symbol. The first element in ordination is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for an indicator tree species. Potential productivity is based on site index. A mean annual increment of one cubic meter per hectare equals approximately 15 cubic feet per acre. For any given indicator species, the larger the class symbol value the greater the potential woodland productivity.

Example: 1 means 1 cubic meter/hectare/year
 3 means 3 cubic meters/hectare/year
 7 means 7 cubic meters/hectare/year

Indicator species: The tree species that is common in the area and is generally, but not necessarily, the most valuable or productive species growing on the soil. For soils developed under non-forested conditions (group O), black oak for upland soils and pin oak for bottomland soils were used as benchmark indicator species.

Site index: Generally defined as the average height that the dominant and codominant trees on an area will attain at a specified age, usually 50 years. Production classes are related to specific tree species.

Use the following chart for relative comparisons of potential production between different tree species:

Potential Productivity Class			
Species	<i>Excellent</i>	<i>Good</i>	<i>Poor</i>
Cottonwood	12	9	6
Ash	6	4	2
Oak (upland)	6	4	2
Oak (bottomland)	6	4	2
Cherrybark oak	10	7	4
Sycamore	8	6	4
Sugar maple	4	3	2
Shortleaf pine	8	6	4
Loblolly pine	10	8	6
Red cedar	3	2	1

Subclass symbol. The second element (subclass) is indicated by a capital letter, which implies certain soil characteristics that contribute to important hazards or limitations in woodland management. Some soils may have more than one limiting characteristic but only one symbol is used. Priority in placing each kind of soil into a subclass is in the order given below. (Note: In Missouri, for FOTG Section II-F, the use of subclass R (slope) has been eliminated. Soils previously assigned to an R subclass in soil surveys and soil interpretation records have been reassigned to one of the subclasses below.)

Subclass X (stony or rocky): Soils having restrictions or limitations because of surface stones (>10 inches) or rocks.

Subclass W (wetness): Soils with restricted drainage, high water tables, or overflow hazards that adversely affect either stand development or management.

Subclass T (toxic): Soils that have within the rooting zone, excessive alkalinity, acidity, sodium salts, or other toxic substances that limit or impede the development and functioning of root systems of tree species.

Subclass D (rooting depth): Soils with restrictions or limitations because of reduced rooting depths caused by bedrock, hardpans, or other layers in the soil that restrict roots.

Subclass C (clayey): Soils with restrictions or limitations because of the kind or amount of clay in the upper portion of the soil profile.

Subclass S (sandy): Sandy soils with little or no textural B horizons, low available water capacity, and normally low in available plant nutrients.

Subclass F (fragmental or skeletal): Soils with restrictions or limitations because they contain large amounts of coarse fragments that are more than .1 inch and less than 10 inches. This subclass also contains flaggy soils.

Subclass A (no major limitations): Soils with no significant soil restrictions or limitations. This class may have some limitations due to slope steepness.

Group symbol. The third element of the woodland suitability group system is the "group" symbol. For woodland interpretive purposes in Missouri, this number is defined by a characteristic native plant community. Soils associated with natural savanna communities are included within the complimentary forested group. All soil series are assigned to one of 10 groups:

- | | |
|-----------------------|---------------------------|
| Group 0: non-forested | Group 5: dry-mesic forest |
| Group 1: glade | Group 6: mesic forest |
| Group 2: xeric forest | Group 7: wet-mesic forest |
| Group 3: dry forest | Group 8: wet forest |
| Group 4: flatwoods | Group 9: swamp forest |

Plant groupings were based on community types in *The Terrestrial Natural Communities of Missouri* by Paul Nelson. A description of each "group" follows.

Group 0 (non-forested): Plant communities are naturally devoid of trees and shrubs. Vegetative structure is simple, usually consisting of a single layer of herbaceous plants (grasses, forbs, sedges, and/or rushes). Low shrubs and scattered trees may occur, but the tree canopy is less than 10 percent.

Group 1 (glade): Grass dominated communities with sparse woody vegetation such as eastern red cedar, blackjack oak, chinquapin oak, and winged elm. Hardwoods gnarled and stunted. Tree canopy height 10 to 20 feet. Canopy cover less than 20 percent. E. red cedar may dominate on some sites. Understory characterized by little bluestem and sideoats grama.

Group 2 (xeric forest): Oak-cedar forest, oak forest, or variations with chinquapin oak, post oak, eastern red cedar, shortleaf pine, farkleberry, and aromatic sumac. Tree canopy heights 10 to 25 feet with 20 to 50 percent canopy cover. Hardwoods often gnarled, limby, stunted and extremely slow growing. Understory poorly developed consisting of widely scattered shrubs. Mosses and lichens always prevalent.

Group 3 (dry forest): Oak-hickory and oak-pine forests with white oak, black oak, post oak, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak are common associates. Tree canopy heights 20 to 60 feet, generally

slow growing with 50 to 80 percent canopy cover. Understory poorly developed consisting of scattered open-grown small trees or shrubs. Lichens and mosses often abundant.

Group 4 (flatwood forest): Oak flatwoods with post oak, blackjack oak, black oak, pin oak, swamp white oak, black hickory. Tree canopy height 60 to 90 feet, generally slow growing with 80 to 90 percent canopy cover. Understory poorly developed consisting of shrubs and small trees.

Group 5 (dry-mesic forest): Oak-hickory, mixed deciduous, or oak-pine with white oak, northern red oak, black oak, shagbark hickory, mockernut hickory, sugar maple. In southern Ozark region, shortleaf pine and black gum are associates. Tree canopy heights 60 to 90 feet; moderate to optimum growth with canopy cover generally 90 to 100 percent. Understory somewhat open to dense.

Group 6 (mesic forest): Mixed deciduous forest with northern red oak, sugar maple, white oak, basswood, bitternut hickory, black walnut. In southeastern region, sweet gum, American beech, and tulip poplar are also associates. Tree canopy heights 90 to 140 feet and closed (near 100%). Understory well developed.

Group 7 (wet-mesic forest): Mixed hardwoods with swamp white oak, pin oak, American elm, shellbark hickory, pecan, green ash, bur oak, cottonwood. In southeastern region, cherrybark oak, overcup oak, and bald cypress are associates. Tree canopy height 90 to 140 feet. Canopy closed and dense. Understory generally well developed. Ground cover mixed and abundant.

Group 8 (wet forest): Mixed hardwoods with pin oak, silver maple, cottonwood, river birch, black willow. In southeastern region, bald cypress, swamp red maple and swamp tupelo, water oak, swamp cottonwood are associates. Tree canopy heights 90 to 140 feet with canopy cover variably open (80-90%) depending upon hydrological fluctuation. Understory poorly developed. Ground cover sparse with late seasonal herbs. Frequent ponding and flooding.

Group 9 (swamp forest): Mixed hardwood forests or cypress forests with bald cypress, swamp tupelo, water hickory, swamp red maple. Tree canopy height 90 to 140 feet. Understory poorly developed or absent. Surface water present for extended periods.

Management Considerations

The success of management activities associated with tree establishment and tree growth are a function of site characteristics, soil properties, and plant community types.

Site Characteristics

Site characteristics can be associated with any woodland suitability subclass designation. Major site characteristics that may affect tree growth include aspect, slope position, and slope steepness.

These site characteristics influence the amount of available sunlight, air drainage, soil temperature, soil moisture, and relative humidity. Usually north and east aspects and lower slope positions, which are cooler and have better moisture conditions, will be more productive than south and west aspects and upper slope positions of the same or similar soil types. Gentle slopes generally accommodate better tree growth than flat or steep slopes.

Soil Properties

Soil properties are fundamentally important for tree growth and tree establishment. One-fourth or more of a tree's mass is located in the soil, which serves a reservoir for moisture, provides an anchor for roots, and supplies essential plant nutrients for growth and plant health.

Important soil properties in Missouri include surface rock, soil wetness, rooting depth, clay content, sand content, and subsurface coarse fragments.

Native Plant Community Types

Community structure and composition will influence management decisions relating to regeneration, tree growth, recreational opportunities, wildlife habitat restoration and improvement, and environmental protection.