Centre County Soil Survey Report
Soil Use and Management

Woodland

Centre County originally had a dense cover of trees. However, clearing for housing and farming plus cutting for commercial purposes eliminated all of the virgin stands of timber. Now the commercial woodland, which occupies 77 percent of the land area, consists of second and third-growth stands.

The principal forest cover types that make up the present woodland and the proportionate extent of each as given by the Forest Service (5) are discussed in the following paragraphs.

The white pine forest type makes up 6.9 percent of the total commercial woodland in the county. Eastern white pine occupies 50 percent or more of the stand. Associated trees are yellow-poplar, northern red oak, and white oak.

The elm-ash-red maple forest type makes up 8.1 percent of the total commercial woodland in the county. American elm, white ash, and red maple predominate. Associated trees are slippery elm, yellow birch, black gum, sycamore, and hemlock.

The maple-beech-birch forest type makes up 9.5 percent of the total commercial woodland in the county.

Sugar maple, beech, and yellow birch are the dominant species. Associated trees are basswood, red maple, hemlock, northern red oak, ash, white pine, black birch, and yellow-poplar.

The aspen-birch forest type makes up 7.9 percent of the total commercial woodland in the county. Quaking aspen, bigtooth aspen, and gray birch predominate. Principal associated trees are pin cherry, red maple, yellow birch, white pine, ash, and sugar maple.

The oak-hickory forest type makes up 64.1 percent of the total commercial woodland in the county. White oak, red oak, and hickory generally predominate, but in some areas black oak predominates. Principal associated trees include yellow-poplar, shagbark hickory, white ash, red maple, beech, and black gum and an understory of flowering dogwood.

The Virginia pine-pitch pine forest type makes up 2.4 percent of the total commercial woodland in the county. Virginia pine and pitch pine predominate. Principal associated trees are northern red oak, black oak, chestnut oak, scarlet oak, black gum, and hickory.

Other oak forest types make up 1.1 percent of the total commercial woodland in the county.

Farmers own 14 percent of the commercial forestland, other private parties own 52.4 percent, the forest industry owns 2.0 percent, the Pennsylvania Game Commission owns 12.1 percent, and the Pennsylvania Department of Environmental Resources, Bureau of Forestry, owns 19.5 percent.
Sawtimber makes up approximately 41.7 percent of the acreage in commercial forests, poletimber 40.3 percent, and seedlings and saplings 16.7 percent. The remaining 1.3 percent is classified as nonstocked (4).

Good woodland management encourages the more desirable kinds of trees to grow. The soils and the climate are favorable. Help in planning a program of woodland improvement can be obtained from local technicians. How much effort a landowner is willing to make probably depends on general economic conditions.

The returns from soils that are excellent, very good, or good growing sites generally justifies the expenditure of money for management purposes. However, consideration should be given to the potential yield, quality of the particular species growing on the site, and the market potential. The species and proportion of poor quality trees growing on such sites in places prohibits the investment of money for management purposes. Also, the conversion of such areas from their present state to their potential capacity is not economically justifiable at times.

Soils that are fair growing sites are the most difficult to appraise for management. A thorough appraisal of the woodland to determine species and site quality is essential. Also, the market possibility should be investigated. A proper analysis of all of these interrelated factors is essential to determine the intensity of management.

The returns from the soils that are poor growing sites generally do not economically justify intensive management for the production of wood products.
Table 3 rates the concerns in management, lists suitable species, and shows the site quality of each soil for producing timber. Following are explanations of some of the columns in table 3.

Erosion hazard.-The ratings indicate the amount or intensity of practices required to reduce or control erosion. A rating of slight indicates that the risk of
erosion is low when wood products are harvested, and that few, if any, practices are needed to control erosion. A rating of moderate indicates that erosion control measures are needed on skid trails and logging roads
immediately after wood products are harvested. A rating of severe means that erosion, especially gullying, is a severe hazard when wood products are
harvested. Harvesting ad other operations should be done across the slope as much as possible. Skid trails and logging roads should be laid out on as low grades as possible, and water disposal systems should be care fully maintained during logging. Erosion control measures are needed on logging roads and skid trails immediately after logging.

Equipment limitations. -Ratings are based on the characteristics of the soils and topographic features that restrict or prohibit the use of equipment for harvesting trees or planting seedlings. Steepness of slope, stoniness, and wetness are the main soil limitations that restrict the use of equipment. The rating is slight if there are few limitations. It is moderate if some problems exist, such as stones and boulders on the surface, moderately steep slopes, or wetness of the soil for part of the year. The rating is severe if prolonged wetness of the soil, steepness, or stoniness severely limit the use of equipment. If the rating is severe, track-type equipment is best for general use, and winches or similar special equipment are needed for some kinds of work.

Seedling mortality.-Seedling mortality refers to the loss of naturally occurring or planted tree seedlings resulting from unfavorable characteristics of the soils. The rating is slight if no more than 25 percent of the planted seedlings are likely to die and satisfactory restocking from the initial planting can be expected. Adequate restocking ordinarily results from natural regeneration. A rating of moderate indicates that between 25 and 50 percent of planted seedlings are likely to die and some replanting is ordinarily needed. Natural regeneration cannot always be relied upon for adequate and early restocking. A rating of severe indicates that more than 50 percent of planted seedlings are likely to die and special preparation of the seedbed, superior planting techniques, and considerable replanting are needed for adequate and immediate restocking. Restocking cannot be expected to result from natural regeneration if the rating for seedling mortality is severe.

Plant competition.-Plant competition refers to the rate at which brush, grass, and undesirable trees are likely to invade. Plant competition is slight if unwanted plants do not prevent adequate natural regeneration and early growth or interfere with adequate development of planted seedlings. It is moderate if competing plants delay natural or artificial regeneration, both establishment and growth, but do not prevent the natural development of a fully stocked normal

stand. Competition is severe if adequate natural or artificial regeneration can be obtained only by intensive site preparation and maintenance, including weeding.

Windthrow hazard.-The ratings for windthrow hazard represent an evaluation of the factors that control the development of tree roots and consequently the likelihood that trees are uprooted by wind. A rating of slight indicates that normally no trees are blown down by the wind. A rating of moderate indicates that some trees are expected to be blown down during periods of excessive soil wetness and high wind. If the rating is severe, many trees are expected to be blown down during periods of soil wetness and moderate or high winds.
Species suitable.-The species suitable are trees that are best suited for planting or managing in existing stands. In planning the development of existing woodland, it is advisable to review this list of trees. The objectives of the landowner determines which species to favor in planting or seeding.

Site quality.-Site quality indicates the general ability of the soils to produce timber. The ratings are based on sample plots in this county and adjacent counties. Other soils in the county that have characteristics similar to those of the soils studied are assumed to have about the same rating. The ratings are based on the average height attained by the dominant and codominant trees at the age of 50 years. Foresters using this rating can determine the volume of timber that normal stands produce at different ages. Yield information on oak is based on data by G. L. Schnur (8). A site index of 85 or better is rated excellent, and the expected yield at age 50 is 13,750 or more board feet per acre (published data for oak do not go beyond site index 80, International rule). A site index of 75 to 84 is rated very good, and the expected yield at age 50 is about 13,750 board feet per acre. A site index of 65 to 74 is rated good, and the expected yield at age 50 is about 9,750 board feet per acre. A site index of 55 to 64 is rated fair, and the expected yield at age 50 is about 6,300 board feet per acre. A site index of less than 54 is rated poor, and the expected yield at age 50 is less than 3,250 board feet per acre. Yield information for yellow-poplar is based on data from E. F. McCarthy (7). A site index of 95 or better is rated excellent, and the expected yield at age 50 is 32,150 board feet per acre. A site index of 85 to 95 is rated very good, and the expected yield at age 50 is about 24,400 board feet per acre. A site index of 75 to 85 is good, and the expected yield is 17,620 board feet per acre. A site index of 65 to 75 is fair, and the expected yield is 11,400 board feet per acre. A site index of 55 to 65 is poor, and the expected yield is 5,600 board feet per acre. The species column under site quality indicates the trees commonly found on the soil.

The site indexes for other trees, such as white pine, sugar maple, ash and black cherry, vary somewhat. The better sites have the taller trees of the same species at the age of 50 years. As the site quality decreases, the height of trees decreases accordingly. More information on site index for other tree species can be obtained from the United States Department of Agriculture, Soil Conservation Service, and the Pennsylvania Department of Environmental Resources, Bureau of Forestry.