

## **Soils and Forests in North Carolina**

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In North America until about 1900, forests were not considered scarce, and thus, the study of forest soils was very limited. At the turn of the century, Carl Alwin Schenck, at the Biltmore Forest School near Asheville, was concerned about severe soil erosion in the Southeast. He investigated the feasibility of halting erosion by reforesting abandoned farm land with appropriate tree species on different soils.

The first major effort to learn about forest soils and their management came following World War I. An enormous amount of timber had been harvested to support the war effort. This was done in haste and the stripped land left bare. Starting in about 1920, there were studies of these soils with the intention of repairing the damage that had been done. This work was slow in getting started, but in 1933, the combination of the Great Depression and the Dust Bowl of middle America, resulted in President Roosevelt establishing the Civilian Conservation Corps (CCC).

Many forest conservation projects were undertaken across the nation and a need for much information on forest soils was evident. Forest soils research received much emphasis at that time. During World War II, massive cutting of forests was repeated. Following the war, the need for information on forest soils again became evident.

Through the 1930s and 1940s, centers for teaching and research in forest soils were limited mostly to Duke University, the University of Wisconsin, and Yale University. Limited work was also underway at other institutions, such as the Black Rock Forest, Cornell University, and at The Harvard Forest. Also, the U.S. Forest Service had some work ongoing at most of its regional research centers, including especially the Southeastern Forest Research Station in Asheville and the Coweeta Hydrologic Laboratory in Otto, N.C.

The Biltmore Forest School operated from 1898 until 1913, when Dr. Schenck returned to Germany. From then until 1929, there was no formal forestry education in North Carolina. In 1929, Dr. Julian V. Hofmann established what is now known as the College of Forest Resources as a Division within the College of Agriculture, at North Carolina State University. A separate School of Forestry was established in 1949. The first

position funded to specifically teach and do research in forest soils was established in the Department of Soil Science in 1962. From the initiation, this position was jointly appointed in both Soil Science and the Department of Forestry.

Beginning in the 1950s, forest soils became a much larger focus in research and teaching. Numerous universities, federal and state agencies, and several forest industries got involved in relating forest growth to soil properties. In 1952, T. S. Coile of Duke University, published a monograph entitled *Soil and the Growth of Forests* (Advances in Agronomy 4: 329–98).

Over the years, subjects of emphasis have changed. This evolution of emphases is best seen in the proceedings of the North American Forest Soils Conferences (NAFSC). Dr. Charles Kellogg, keynote speaker at the first conference in 1958, stressed the importance of multiple use of forest soils, soil management in relation to forest productivity, soil engineering applications in forestry, land use patterns, and soil classification and mapping in forest environments. The second conference stressed soil survey of forest lands. The third conference, held in North Carolina in 1968, emphasized soil biology, tree roots, and forest fertilization. Operational fertilization was obviously coming of age because in that same year, the Tennessee Valley Authority published a book on the theory and practice of forest fertilization.

Subsequent conferences have stressed land classification and land-use planning, geology and landscape stability as related to forest management activities, acid rain and its impacts on forest ecosystems, recovery of mined lands, and soils information needed for intensive forest management. The more recent conferences have stressed sustainable forest productivity and economics of forest soil management, carbon forms and functions in forest soils, humus forms and their relation to soil management, forest health, and microbial ecology in forest soils, especially the study of mycorrhizae.

Because forests are expected to serve the multiple uses of wood production, recreation, range, wildlife habitat, and watershed protection, the soil that supports these forests must also serve many purposes. All of these functions have been subjects of teaching and research in North Carolina. As the century ends, the major emphases in North Carolina are on tree nutrition (forest fertilization on an operational basis); the forms and functions of mycorrhizae on tree roots; nitrogen dynamics, fixation, and transformation in forest soil; wetlands restoration and management; hydrology and watershed management; and forest ecology, especially as influenced by atmospheric inputs. As history will show, North Carolina has had a pivotal role in forest soil science for the entire century. The natural occupation of North Carolina lands is the growth of trees. Even in our present highly developed condition, two-thirds of the land of the State of North Carolina is forested.