Long-Term Trends in Ecological Systems: A Basis for Understanding Responses to Global Change
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The Coweeta Hydrologic Laboratory (CWT), a USDA Forest Service Research Station, was established in 1934 as a testing ground for certain theories in forest hydrology; it was established as an LTER site in 1980. The site is located in the Nantahala Mountain Range of western North Carolina, and consists of two adjacent east-facing, bowl-shaped basins. Coweeta Basin (1,626 ha) is the primary site for watershed experimentation, and Dryman Fork Basin (559 ha) is held in reserve for future studies.

The climate is humid subtropical at the lowest elevations and marine humid temperate at the higher elevations. Winters and summers are mild; there is little snowfall, and summer days with temperatures exceeding 30 °C are rare. Rainfall is evenly distributed throughout the year, with considerable spatial variability related to elevation and latitude. Precipitation generally increases about 5 percent per 100 m of elevation gain along an east-west axis. The dominant vegetation is temperate deciduous forest (figure A1-19), although the intermixing of “northern” and “southern” taxa results in one of the most biodiverse regions of North America.

Long-term research example. Research from CWT shows the importance of monitoring large numbers of individual trees and of measuring trees over long periods. Individual trees have been measured over time to estimate growth (figure A1-20). Both red maple and white pine trees show wide variation in growth of the basal area of the trunk through time. Some trees grow very little from one year to the next, whereas other trees of the same species located nearby show high growth rates. Thus, growth rates may be related to fine-scale variation in environmental conditions (such as soil properties) and within-species genetic variability rather than broad-scale climatic conditions.