Temporal and spatial variations in soil and environmental conditions occur in forested ecosystems at a variety of scales. Humans' limited understanding of this variation and its impacts on forest management are fiscally and environmentally expensive in terms of misplaced investments and land-use caused environmental degradation. Current systems of forest land classifications lack sufficient detail for site- and use-specific management applications, fail to delineate all important environmental factors, are effectively applied to large areas without regard to scale effects, and are not easily communicated to land managers and planners. Two alternative systems for forest land classification have been proposed: a multi-factor ecological land classification (ECS); and an innovative soil survey approach that is more precise, comprehensive and forestry oriented.

Landforms have been proposed as a basic unit for classifying forest lands because of their influences on and covariances with a variety of environmental factors; their easily observable features and their relative stability in the landscape. A Landform is defined by its surface shape, location in relation to other landforms, underlying geologic materials, and soil attributes.

Geographic Information Systems (GIS) was used with commonly available digital elevation models (DEM’s) to produce digital terrain models (DTM’s) in the Missouri Ozarks. The DTM’s were evaluated for their accuracy in portraying landforms and important soil-geomorphic-ecological patterns on sites covering 3691 ha (9120 acres). The best terrain models correctly identified slope classes 72% of the time, aspect classes 85% of the time and landforms 71% of the time in a complex region. A soil-geomorphic-ecological approach using terrain modeling proved to be a consistent, dynamic, efficient and cost-effective method for classifying forest lands.