Public Abstract
Christopher Joseph fabian
M.S.
Soil, Atmospheric and Environmental Sciences
Application of a Digital Terrain Model for Forest Land Classification
and Soil Survey
Advisor: Dr. R. David Hammer

_____

advisor signature

Graduation term: Fall, 2004

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.