Why Is Impervious Surface Important?

Spectral Approaches

- Landsat ETM Imagery
- CCL Land Cover
- NLCD Land Cover
- Sub-pixel Estimates

IS Measurement Methods

- Interpretive Approach
  - Point sampling (Cover Tool method)
- Modeling Approach
  - Population-based
    - Impervious Surface Analysis Tool (ISAT)
    - Regression Model

Spectral Approach

- Sub-pixel Classification
  - Classification and Regression Tree (CART)
- Normalized Difference Vegetation Index (NDVI)
- Vegetation-Impervious surface-Soil (VIS) model

Source Data

- Connecticut towns from which planimetric data were obtained
- Photogrammetrically-derived planimetric data portraying the built landscape for ten towns in Connecticut served as validation data for each of the methods examined, and as calibration for all but one of the techniques (the NLCD 2001 impervious surface data set was developed independently of this project). Tracts for the 2000 census TIGER files served as the analysis unit over which actual and estimated imperviousness was summarized. For the ten towns there were a total of 82 census tracts. Landsat ETM data acquired in 2002 served as the basis for CCL land cover and CCL subpixel imperviousness.

Conclusions

There are advantages and disadvantages to each of the impervious surface estimation methods examined. The higher accuracy achieved with the population and land cover-based regression model is especially appealing because of the wide availability of NLCD and population data. In addition, the model is fairly easy to implement within a GIS. It can be adapted and recalibrated to different analysis units such as census blocks or watersheds. On the other hand, the spectral approaches, while seemingly less accurate when examined at the tract level, do offer the advantage of being spatially explicit – that is, they provide positionally-specific (at the pixel resolution) imperviousness estimates, rather than a homogenous (lumped) measure as do the other methods.

References