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MACHINE PROCESSING OF REMOTELY SENSED
DATA FOR CHANGE DETECTION

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THE SOUTH DAKOTA LAND USE
INVENTORY SYSTEM

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ABSTRACT

Remote sensing can furnish a quantitative method for detecting change in earth surface features. LANDSAT-1 MSS data was temporally overlaid and geometrically corrected. Data from one date was then classified and a LARSYS results tape produced. Data from the second date was then similarly processed. Classifications for the same geographical area were then available for two (or more) dates. These classifications were then compared on a point by point basis by the computer to determine the type and location of changes occurring for the intervening period between data sets.

Two applications of this post-classification change detection technique were made. The first was used to study fluctuations of the snowpack in the Rocky Mountains of Colorado. The purpose of this application was to accurately determine the rate of diminution of the snowpack and thus provide information for predicting flow rates. The second application was to study land use changes in Marion County, Indiana to provide information to land use planners.

ABSTRACT

All levels of government share the need for natural resource information. Remote Sensing and computer technology can provide a cost effective means of collecting, analyzing, and synthesizing some of this data.

One of the principal areas where remotely sensed data is being applied in governmental natural resource planning is in the generation of land use, or more precisely, land cover information. The South Dakota State Planning Bureau, with assistance and technical support from the EROS Data Center, is implementing a Land Use and Natural Resource Inventory and Information System. A three phase program has been designed utilizing LANDSAT digital data and high altitude photography as the primary data sources for a statewide inventory.

The LANDSAT Imagery Analysis Package, developed over the last two years by the author, is being used for digital data analysis and display. This program system has many capabilities: Combination and reformatting of single or consecutive scenes; display of grey tone maps of raw data; linear rectification of areas of up to three million pixels; selection and editing of training fields; two or four band clustering for single season or temporal data; Gaussian Maximum Likelihood classification for four band data; table lookup classification for two band data; combination of categories and aggregation of data in up to forty acre cells; generation of color coded or grey tone land use maps of categorized data at scales ranging from 1:24,000 to 1:500,000; and storage and retrieval of categorized data on a county, municipal, or township basis.