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LANDSAT MSS DATA AS AN AID TO SOIL SURVEY-- AN OPERATIONAL CONCEPT

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ABSTRACT

With the urgency throughout the country to complete the modern soil survey at the earliest possible date, new techniques and tools are being devised to carry out the soils mapping program. One such new mapping tool is a series of maps, derived from Landsat data, showing the spectral characteristics of soils. Whereas Jennings County, Indiana was the first county in the nation to be mapped using aerial photographs as base maps, Jasper County, Indiana is the first county to be mapped using spectral maps as an aid in the county soil survey program. These spectral maps depict the pattern and boundaries of the soils occurring throughout the landscape of Jasper County.

The spectral information was produced using computer-aided analysis (LARSYS) of Landsat-1 multispectral scanner (MSS) data collected on 9 June 1973. Prior to analysis, the Landsat data were geometrically corrected and registered to aerial photography (1:15,840) collected for the USDA/Soil Conservation Service on 3 May 1976. Soil parent material boundaries visually interpreted from the Landsat imagery were used to stratify the county and classify spectral responses representing various soils within unique parent material areas.

Correlation of the spectral responses with soil characteristics was accomplished by comparing the spectral maps with conventionally prepared soil maps for randomly selected quarter sections throughout the county. Correlation of the spectral responses with soil characteristics such as surface color, surface texture, organic matter content and soil drainage was possible. The final spectral maps were correlated only with soil drainage characteristics since this correlation proved to be most consistent.

The mapping of Jasper County is being carried out on half tone positive mylar which show the aerial photographic image of the mapping area. These mylar images can be overlaid on the spectral maps, thus allowing the soil scientist the benefit of both conventional aerial photography and the soil spectral characteristics for use as guides in delineating map unit boundaries. The use of the soil spectral characteristics should greatly enhance the efficiency of producing a higher quality soil survey.

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