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Gary E. Johnson

Thomas R. Loveland

William H. Anderson

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A REMOTE SENSING AND GEO-BASED INFORMATION SYSTEM APPROACH TO THE ASSESSMENT OF IRRIGATION DEVELOPMENT POTENTIAL

GARY E. JOHNSON, THOMAS R. LOVELAND AND WILLIAM H. ANDERSON EROS Data Center

The Earth Resources Observation Systems (EROS) Data Center is engaged in a cooperative demonstration project with the Portland District of the U.S. Army Corps of Engineers. This study is using remotely sensed data and a geo-based information system to evaluate present and future effects of irrigation development on the flow of the Columbia River.

The Stanfield, S.E., Oregon, 7.5 minute quadrangle was chosen as a test area. Land cover shown on a 1972 Landsat subscene was classified as irrigated land, dryland agriculture, rangeland, and wetland. Soils maps of the area were interpreted to determine the potential of the soils to support irrigation development. The resultant potential irrigation map was digitized and entered into a geo-based information system along with slope derived from digital terrain data. A map of the potential for irrigation was then derived based on 1972 land cover, soils, and slope. The composite map revealed that the most favorable terrain for irrigation development was in the southeast part of the quadrangle.

Economic factors involved in irrigation--distance and elevation from the source of water (the nearest point on the Columbia River) -- were also entered into the geo-based information system. It was assumed that irrigation pumping costs increase in proportion to distance and elevation from the source of water. When qualitative economic data were included in the geo-based model, it was noted that areas with the greatest probability for irrigation development were in the northwest quadrant of the study area (nearer the source of water than the southeast part). Landsat imagery from 1977 shows that irrigation development occurred as predicted when distance and elevation from water source

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were included in the geo-based model. Quantitative cost data are currently being derived by the Corps of Engineers prior to expanded use of the model in a 1.5 million acre study area in the Columbia River Basin.

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