Spatial Multicriteria and Fuzzy Threshold Analyses Techniques for Assessing Land Condition. (A02-anderson120952-Poster)

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Abstract:

Land condition analysis is inherently a multicriteria analysis problem requiring many factors to be taken into consideration such as soil loss rate and vegetation parameters. A methodology is presented to evaluate land condition and allocate restoration activities. The approach is based on simulation, spatial multicriteria analysis and fuzzy logic. Multicriteria techniques were integrated with spatial analysis through Geographic Information Systems to make land condition assessment geographically specific. There are two sources of uncertainty in this analysis: 1) incomplete information on the land condition and 2) identifying the condition of a particular parcel of land. The first source of uncertainty was addressed by using sequential Gaussian simulation. Land allocation uncertainty was based on fuzzy logic to reflect the continuous transition between different land condition classes with the use of membership functions, and the minimization of loss that is to occur in case of misallocation. Several loss functions were used to identify areas in need of restoration. The proposed method is compared to several alternative methods with varying degrees of determinism and uncertainty.

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