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Multiobjective management of ecosystem services by integrative watershed modeling and evolutionary algorithms

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[1] This paper explores the role of landscapes in generating ecosystem services while maximizing gross margin associated with agricultural commodity production. Ecosystem services considered include the reduction of nonpoint source pollutants such as sediment, phosphorous, and nitrogen yields from a watershed. The analysis relies on an integrative modeling framework that combines a comprehensive watershed model (SWAT) with a multiobjective evolutionary algorithm (SPEA2). Application of the resulting model to a watershed in southern Illinois demonstrates the effectiveness of the approach in providing tradeoff solutions between gross margin and the generation of ecosystem services. These solutions are important to policy makers and planners in that they provide information about the cost-effectiveness of alternative agricultural landscapes.

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