

USDA/NIFA Program: *Managed Ecosystems*

TITLE: Multi-Criteria Optimization to Evaluate and Sell Forest Ecosystem Services

INVESTIGATORS: Toth, S.F. (PI); G.J. Ettl and S.S. Rabotyagov

INSTITUTION: University of Washington

AMOUNT: \$500,000

NON-TECHNICAL SUMMARY: Using NIFA award WNZ-1398 in FY2009, we promised to build, test and deploy a new subscription mechanism for forest ecosystem services. The ECOSEL concept combines multi-objective optimization technology with a unique auction platform to match willing sellers of eco-services with willing buyers. Optimization is used to identify management plans that lead to Pareto-optimal bundles of forest benefits such as timber, carbon and old-forest habitat. Bids are solicited for the bundles using the opportunity costs of the plans as reserve prices. The plan with bids whose combined value most exceeds the reserve price is implemented. The goal of the project is to demonstrate the mechanics of the new technique in a real decision-making context. The funding is for (1) building a web-based implementation of ECOSEL, (2) fine-tuning the design variables of the mechanism both theoretically and empirically, (3) running a real auction, and (4) studying the participants' bidding behavior along with the winning scenario to better understand the stakeholders' monetary preferences with respect to ecosystem services. We will also use the dollars to expand the use of ECOSEL as an educational tool in resource management and environmental economics classes, and as laboratory equipment for economists to study public goods contribution games. ECOSEL promises a new mechanism that not only optimizes the concurrent production of multiple ecosystem services but it also provides a funding platform to reward the landowners who implement these production systems.

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