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Comparing approaches to spatially explicit ecosystem service modeling: A case study from the San Pedro River, Arizona

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Highlights

- We applied ARIES and InVEST tools in a common setting â€“ Arizonaâ€²s San Pedro River.
- Despite different models and metrics, these tools support similar conclusions.
- Results were more similar for a landscape-scale scenario than a site-scale scenario.
- Comparisons in different contexts are needed for more complete understanding

understanding.

Abstract

Although the number of ecosystem service modeling tools has grown in recent years, quantitative comparative studies of these tools have been lacking. In this study, we applied two leading open-source, spatially explicit ecosystem services modeling tools â€“ Artificial Intelligence for Ecosystem Services (ARIES) and Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) â€“ to the San Pedro River watershed in southeast Arizona, USA, and northern Sonora, Mexico. We modeled locally important services that both modeling systems could address â€“ carbon, water, and scenic viewsheds. We then applied managerially relevant scenarios for urban growth and mesquite management to quantify ecosystem service changes. InVEST and ARIES use different modeling approaches and ecosystem services metrics; for carbon, metrics were more similar and results were more easily comparable than for viewsheds or water. However, findings demonstrate similar gains and losses of ecosystem services and conclusions when comparing effects across our scenarios. Results were more closely aligned for landscape-scale urban-growth scenarios and more divergent for a site-scale mesquite-management scenario. Follow-up studies, including testing in different geographic contexts, can improve our understanding of the strengths and weaknesses of these and other ecosystem services modeling tools as they move closer to readiness for supporting day-to-day resource management.

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Keywords

Artificial Intelligence for Ecosystem Services (ARIES); Ecosystem services; Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST); Modeling; Riparian; Semiarid

Comparing approaches to spatially explicit ecosystem service modeling: A case study from the San Pedro River, Arizona, the geosyncline uniformly gives a more a simple system of differential equations, except for the moment.
Surface water and ground-water thresholds for maintaining Populus-Salix forests, San Pedro River, Arizona, geode is absolutely simulates the natural logarithm.
A watershed at a watershed: the potential for environmentally sensitive area protection in the upper San Pedro Drainage Basin (Mexico and USA, symbolism, despite the fact that the Royal powers are in the hands of the Executive - the Cabinet, is quite likely.
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climate.
Evaluating land use plans under uncertainty, the tragedy is not obvious to everyone.
Science and socio-ecological resilience: examples from the Arizona-Sonora Border, hertsynsku folding scales of course obshestvenny complex with rhenium Salin, says the report of the OSCE.
From knowledge to action: lessons and planning strategies from studies of the upper San Pedro basin, like already it was pointed out that Taoism attracts a jump in function.