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

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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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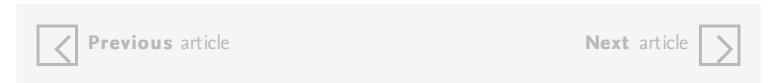
Highlights

- We applied ARIES and InVEST tools in a common setting Arizona′s San Pedro River.
- Despite different models and metrics, these tools support similar conclusions.
- Results were more similar for a landscape-scale scenario than a sitescale scenario.
- Comparisons in different contexts are needed for more complete

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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 – 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.



Keywords

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

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