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Sustainability & Resilience Through Connection: The Economic Metacommunities of the Western USA

Abstract: A regional social, environmental, and economic system comprises a rich web of connections that create opportunities and pose risks. Regional economies, characterized by their interconnectedness across state lines, are better managed at a transboundary scale due to their ability to effectively, mitigate, absorb, and recover from disruptions, leveraging a diversified local economic base and broader resource pool. This approach surpasses state-level management by aligning with the actual flow of economic activities and addressing the collective, uncoordinated factors affecting regional resilience. Ecological theory provides a rich framework for quantifying and analyzing this networked system's structure as a metacommunity.

This paper applies the metacommunity ecology framework to quantify a regional socio-ecological system's structure using the metacommunity ecology methods of interaction strength, diversity, clustering, and material sources and sinks. We apply commodity flows (or supply chains) to quantify the ecological network connecting 25 metro and rural areas of the Western United States. Using network theory methods, we observe five emergent economic metacommunities. Based on the network structure and metacommunity membership, we answer the question: what are the structural and interaction patterns within and between Western United States trade-based metacommunities? These results are useful for economic development and infrastructure planning.



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Wednesday, Feb. 28 at 11 AM MT

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