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**Title:** Designing Democratized Sensor Networks for Environmental Decision Support

**Abstract:** Land and resource managers need accurate data from science in order to make effective and sustainable decisions. Data from environmental science is traditionally collected through a combination of manual surveys, satellite remote sensing, and ground-based sensors. These data are frequently used in models and workflows for decision making that rely on observed relationships. These relationships, along with mechanistic assumptions, predict conditions and outcomes over time and space. Modern technology creates opportunities to improve quality, accuracy, and timely delivery of data products for environmental science. Particularly, low-cost sensor systems connected by real-time data networks (e.g., the Internet of Things - IoT) is rapidly changing the research and management landscape. In the Intermountain West, the adoption of IoT so far has been grassroots and piecemeal. Our work is focused on development of science-ready IoT solutions, standardizing deployment models and associated data workflows to serve decision makers in water, fire, snow, recreation, and conservation communities. Initially, we are testing environmental sensor deployments that use Long Range Wide-Area Network (LoRaWAN) communications technology, Starlink internet terminals, terrestrial wireless research network connections, and robust solar power systems. Our science questions are focused on snow hydrology, climate variables, burned landscapes, and recreational access in Sierra Nevada and Great Basin settings. Our early results are showing that low-cost (<$100) soil and air sensors can be deployed in the Lake Tahoe region with minimal disturbance and reliable network communications to hub sites across mountain terrain separated by many kilometers. Use of SpaceX Starlink satellite communications for encrypted data backhaul has been demonstrated. Our next steps include building out more permanent testbed sites associated with fire science and snow hydrology projects in the region, where we will refine the solutions architecture, capture all-season performance metrics, and contribute to active multidisciplinary science and engineering research in the region.