Living skin of the desert: The role biological soil crusts play in the hydrology of the Upper Colorado River Basin

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Abstract:

Biological soil crusts are assemblages of lichens, fungi, cyanobacteria, and mosses that create a cohesive layer on the soil surface. They can comprise more than 70% of the living ground cover in many arid environments. Understanding the role of these often-forgotten organisms is crucial to mitigating many of the major environmental issues we face in the Upper Colorado River Basin. Here, I present a synthesis of research conducted over the past 40 years in the UCRB and highlight the role biological soils crusts play in the pressing issues affecting the hydrology of the region. Biological soil crusts can dramatically reduce runoff and soil erosion but are highly vulnerable to surface disturbance. Their loss exacerbates issues like dust on snow and sediment deposition into surface waters, thus decreasing water quantity and quality. Nutrients contained in soils are lost from the source area while often polluting areas where they are deposited. Protecting and restoring biological soil crusts may enhance the resilience of dryland ecosystems to the pressures of altered hydrologic regimes, increasing land disturbance, and climate change.