Enabling the Study of Multi-trophic Responses in Restoration

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A main goal of restoration is to sustain biodiversity at multiple trophic levels while improving resiliency and ecosystem function. Monitoring is a key component of successful restoration to evaluate and quantify success and adjust management as needed. However, it is often challenging to determine what the appropriate benchmarks for success should be with ever-changing environments and multi-trophic systems that might have opposing responses. In an effort to restore lands managed by Denver Botanic Gardens and establish projects that can be used to demonstrate and study successful riparian and prairie restoration, we endeavor to establish standardized long-term monitoring efforts, but also evaluate projects across multiple trophic levels to understand how the ecosystem is connected and how restoration techniques might differentially impact riparian and upland communities. For a riparian project initiated in 2015, we installed in-stream structures to reconnect the floodplain and long-term monitoring plots with extensive plant, water, and aquatic macroinvertebrate sampling. We will present the first four years of this work. In 2018, we started a prairie restoration experiment to examine the impacts of different seeding and herbicide treatments to remove a dominant non-native and increase plant diversity. In addition to measuring the impact on the plant community, we have invited colleagues to investigate the impact of these restoration treatments on the soil microbial and pollinator communities. Not only is this important for restoration in general but is especially important to the local land managers as the restoration site is also on a working farm that aims to implement sustainable agriculture practices.

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