Using Long-term Community Science Monitoring to Inform Middle Rio Grande Bosque Restoration

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Bosque restoration faces numerous challenges including anthropogenic alteration, climate stressors, and changing conditions in areas that need restoration work. The Albuquerque District U.S. Army Corps of Engineers (USACE) designed and constructed the Middle Rio Grande Bosque habitat restoration project at 17 sites along a 22-mile reach of the Middle Rio Grande in the Albuquerque area from 2011 to 2016. Restoration work focused on restoring river function and included removing non-native vegetation, planting native vegetation, and excavating floodplain terraces to create seasonally inundated riparian wetlands. Following construction, USACE worked with various entities, including the Bosque Ecosystem Monitoring Program (BEMP, a community engaged research program) to monitor the outcomes of these projects.

BEMP collects monthly data with students (primarily from Title I schools) including depth to groundwater, precipitation, litterfall, and site observations. Other core data sets collected by BEMP include surface-active arthropods, vegetation surveys, water chemistry, tamarisk leaf beetle presence/density, temperature data, phenology, and fuel load. GeoSystems Analysis, Inc and Tetra Tech, Inc conducted additional vegetation and soils monitoring. Results of monitoring have not only provided insight into effectiveness of restoration methods, but allowed lessons learned from monitoring at early sites to inform design at sites constructed later. The long-term data collected is also being used to inform management in the face of climate change.

We focus on lessons learned and highlight several USACE project sites. We demonstrate data-driven take-home points including the need to connect to groundwater to support native riparian vegetation, the significance of soil type in restoration design and success of willow planting, how on-site wood chipping without flooding supports exotic species, and the importance of fire intensity and groundwater availability as drivers of post-fire recovery.

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