Effects of Landscape Transformations on Urban Heat and Water Quality
Application to the Colorado Water Conservation Board (CWCB) Water Plan Grant
Due December 1, 2023

Application by:

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Existing Partners:

- Wright Water Engineers (Jane Clary)
- Mile High Flood District (Holly Piza)
- Denver Water (Katie Spahr)
- LRE Water (Mark Mitisek)
- USGS (Peter Ibsen)
- City and County of Denver

Landscape transformations are ramping up in Colorado. Water providers are starting or expanding turfgrass replacement programs with CWCB support. Furthermore, in 2022, Denver Water joined an MOU with other Colorado River Basin water providers to reduce non-functional turfgrass by 30%. Because of environmental linkages, landscape transformations will affect not just water use but also urban heat and water quality, which both of are already under pressure. Urban heat in the metro area is under pressure from climate change. Water quality in the metro area is under pressure with the increasing requirements for nutrient reductions for MS4 and TMDLs, as well as basin control regulations. To address these effects, this application proposes two objectives:

Objective 1: Quantify the effects of landscape transformations on urban heat in the Denver metropolitan area.

This objective will be achieved by:

- Analyzing remotely-sensed (Landsat at 30 m resolution) temperature changes before and after landscape transformations have happened using Denver Water's mapping.
- Deployment of low-cost sensors that measure hourly air temperature and relative humidity placed on trees in areas where landscape transformations have occurred or will be occurring (for example, on Denver Water campus).

Objective 2: Quantify the effects of landscape transformations on water quality in the Denver metropolitan area.

This objective will be achieved by:

- Monitoring nutrients in streamflow from a watershed in Sterling Ranch's low-water use landscape, developed with entirely turfgrass alternatives.
- Comparison of nutrients in streamflow from other watersheds with conventional turfgrass landscapes.