The wetland plant community varies with water availability across the Salt River accidental wetlands.

Field observations of plants, water, and tissue sample data will be analyzed.

Nitrogen uptake and processing may be dependent on complex interactions between community composition and environmental conditions, which vary over time and space within a site.

Examples of accidental wetlands. Sites vary in plant community composition and vegetation abundance.

Nitrogen uptake and processing may be dependent on complex interactions between community composition and environmental conditions, which vary over time and space within a site.

How do plant community interactions vary as a function of inundation or water availability in an arid urban wetland, and how does this variation affect nitrogen uptake?

H: Plant species traits determine the response to variations in environmental conditions, and thus the capacity for nitrogen removal.

P1: Uptake rates and tissue nitrogen concentration will vary among species and functional groups.

P2: Plant abundance and uptake rates will vary as a function of water conditions, due to species specific tolerances to inundation thresholds.

P3: Plant species interactions will vary between plant functional groups, with like species experiencing greater competition effects reflected in uptake rates in species combinations.

P4: Variable species interaction effects among inundation conditions will result in variable nitrogen uptake.

Greenhouse mesocosm manipulations of wetland plant interactions and water conditions. Dominant wetlands in various combinations will experience simulated ephemeral intermittent, and perennial water conditions. Growth, survival and tissue chemistry will be measured.

Variation in plant communities along the Salt River over time (Bateman et al. 2015). Sites vary in cover type and water permanence.

Effect of dominant wetland plant species on nitrate removal in mesocosm study (Suchy 2016). Demonstrates the importance examining these trends over time and in context of the community.

Accidental wetland sites along the Salt River. Wetland sites were designated ephemeral, intermittent, or perennial given water permanence of less than 40%, 75%, or 95%, respectively.

Effect of dominant wetland plant species on nitrogen uptake over time and space within a site.
How frequently wetlands inundate partially dictates the zonation of wetland functional groups and these different groups may respond differently to the presence of other species (van der Valk 1981; Boutin and Keeddy 1993). Therefore, it is possible the direction of the relationship between species richness and biomass could be dependent on the environmental context, such as inundation duration, in wetlands.