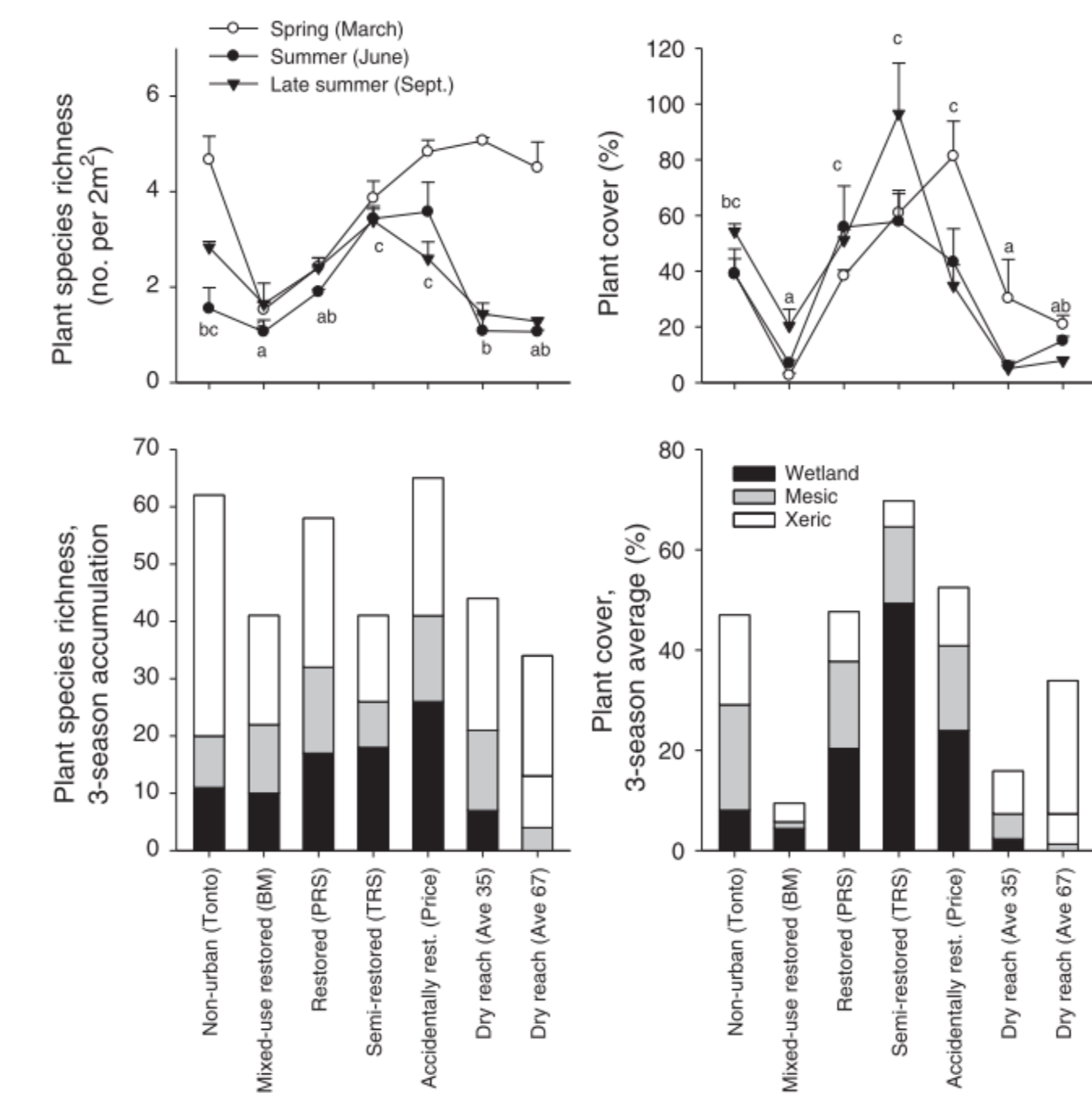
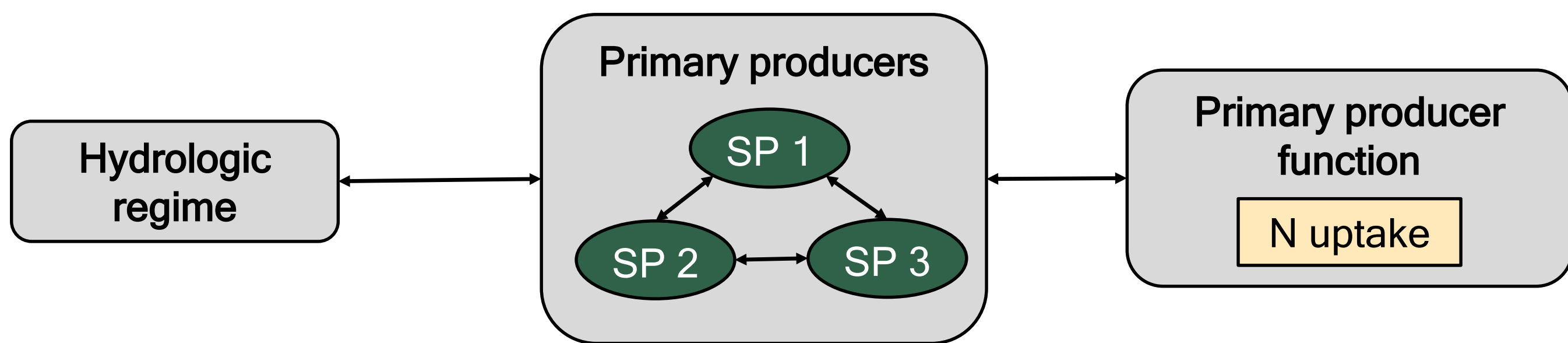


EFFECTS OF VARIABLE INUNDATION PATTERNS ON WETLAND PLANT COMMUNITIES AND NITROGEN UPTAKE IN THE SALT RIVER WETLANDS

Background



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



	Present	Absent	Std beta coefficient	P
T1 (October 2015)				
L	0.1 (0.1, 0.2)	0.1 (0.0, 0.2)	0.21	0.11
P	0.1 (0.1, 0.2)	0.1 (0.0, 0.1)	0.13	0.32
S	0.1 (0.1, 0.2)	0.1 (0.1, 0.2)	-0.02	0.91
T	0.1 (0.1, 0.2)	0.1 (0.1, 0.1)	0.009	0.95
starting conc			0.635	<0.001
T2 (April 2016)				
L	2.4 (1.8, 2.9)	2.6 (2.1, 3.2)	-0.15	0.32
P	2.0 (1.5, 2.5)	3.0 (2.5, 3.5)	-0.42	0.009
S	2.4 (1.9, 2.8)	2.6 (2.0, 3.2)	-0.15	0.33
T	2.9 (2.3, 3.4)	2.1 (1.6, 2.7)	0.18	0.24
starting conc			0.05	0.81
T3 (May 2016)				
L	4.0 (2.9, 5.0)	2.1 (1.0, 3.3)	0.02	0.87
P	2.0 (1.0, 3.0)	4.1 (2.9, 5.3)	-0.23	0.02
S	2.8 (1.7, 3.8)	3.4 (2.1, 4.6)	-0.14	0.16
T	3.9 (2.8, 5.0)	2.2 (1.1, 3.4)	0.22	0.02
starting conc			0.70	<0.001

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.

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.

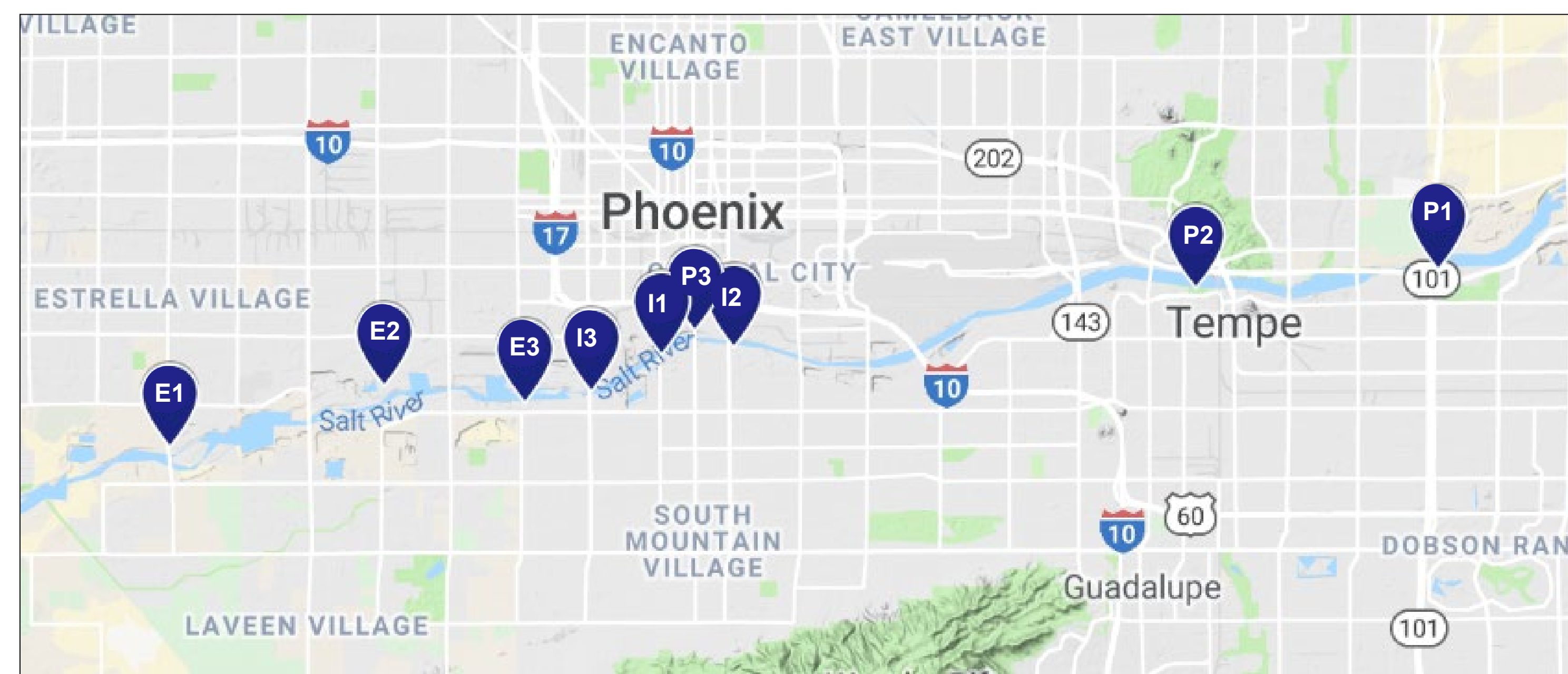
Question, Hypothesis, and Predictions

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 group,
- 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.

Methods



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.

$$\text{Tissue chemistry} = f \left[\begin{matrix} \text{Community composition} \\ \text{Water depth \& permanence} \end{matrix} \right] t$$

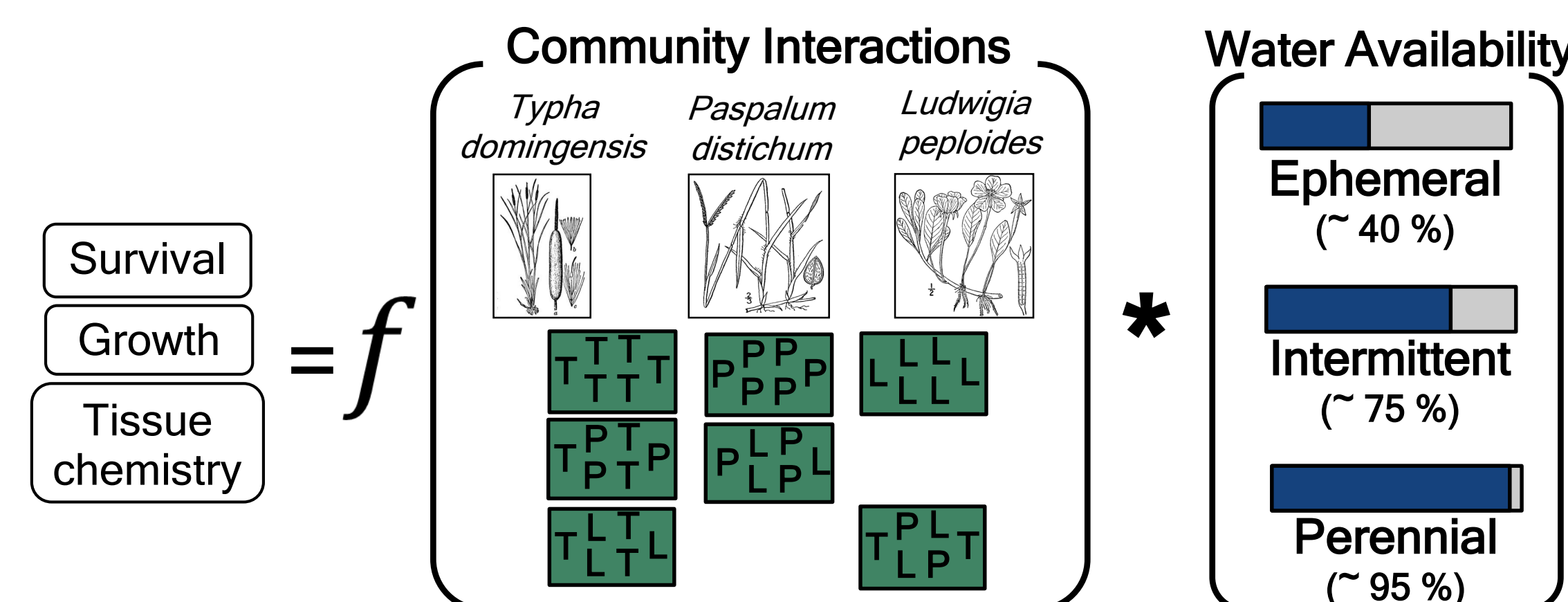
Field observations of plants, water, and tissue chemistry. Monthly transect and tissue sample data will be analyzed.



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

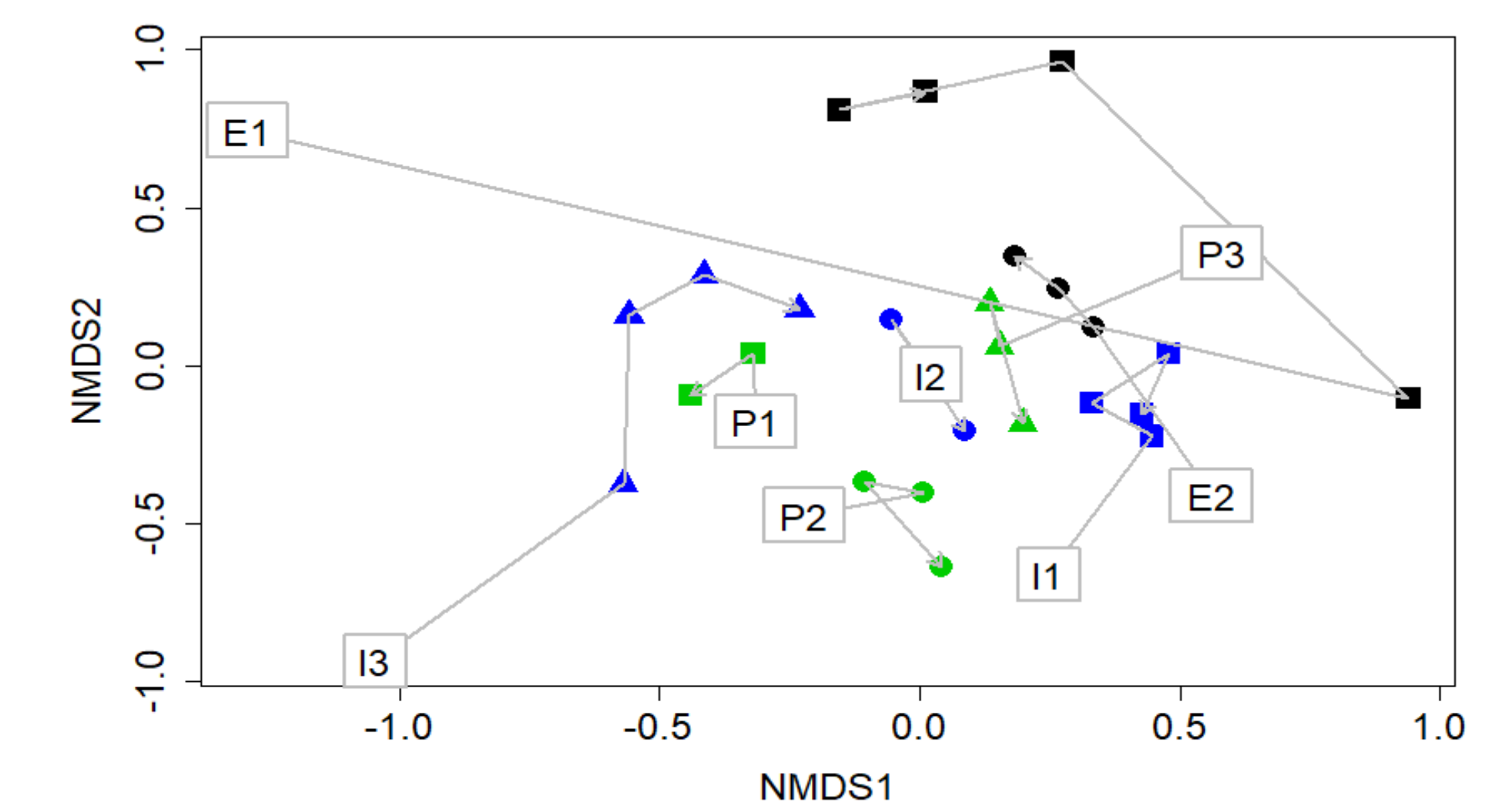
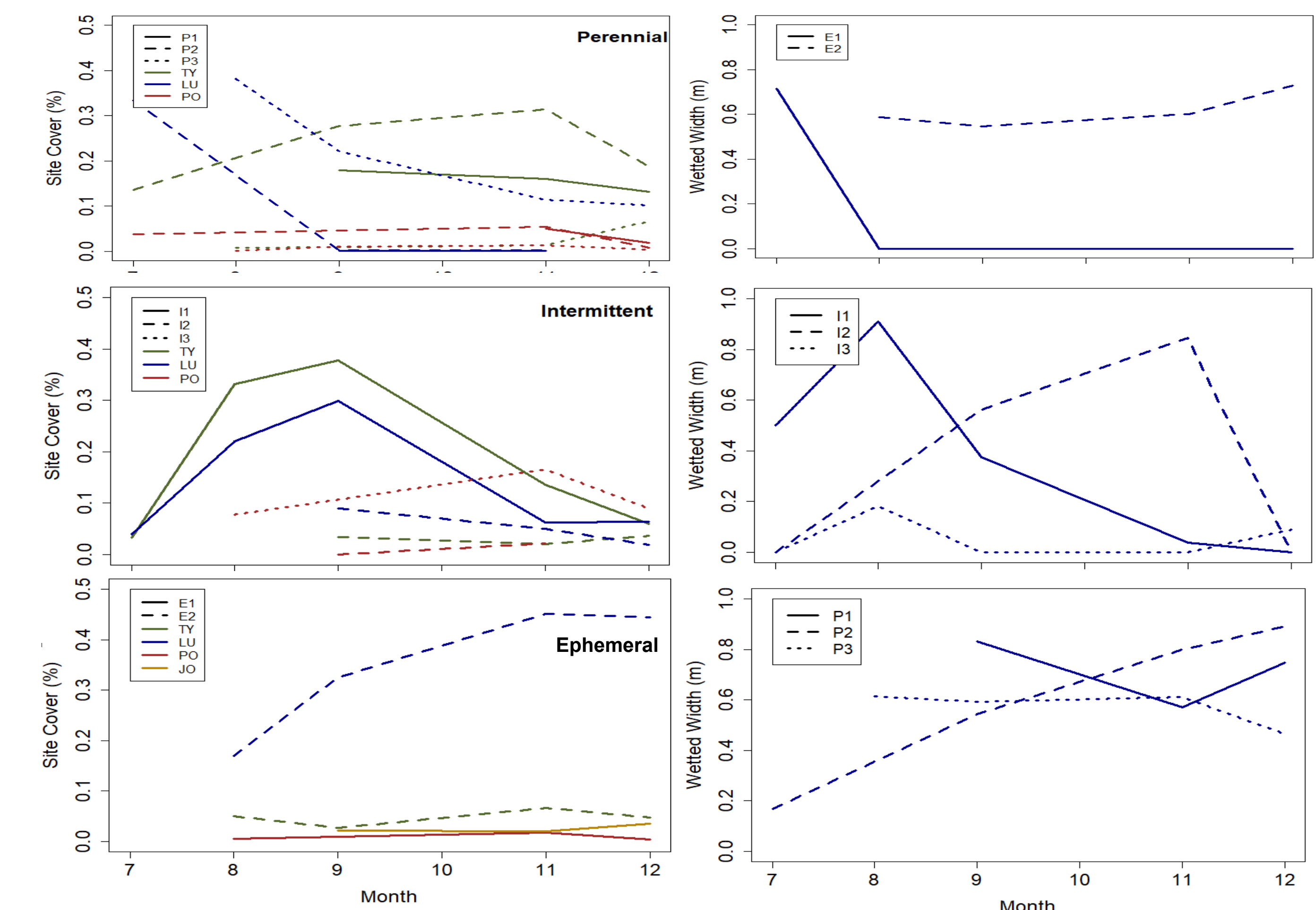


Water discharge from drainage outfalls vary in time. Above is ephemeral site, 67th ave) in July (top) and August (bottom). Maximum water depth in July was <1m.



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

Preliminary Results



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

Tissue Chemistry



Hydrology
Water permanence
Flood regime

Biology
Species/Functional group
Community composition

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.

Acknowledgements

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