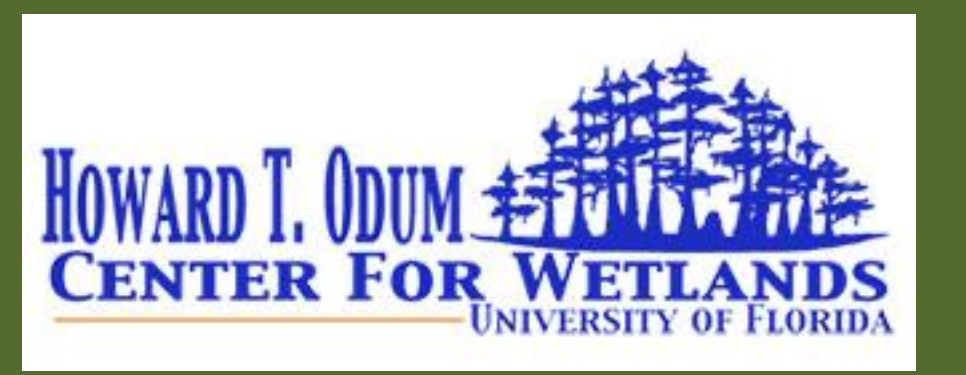


How Wetland Geomorphic Characteristics Shape Ecohydrologic Metrics in Isolated Reference Wetlands

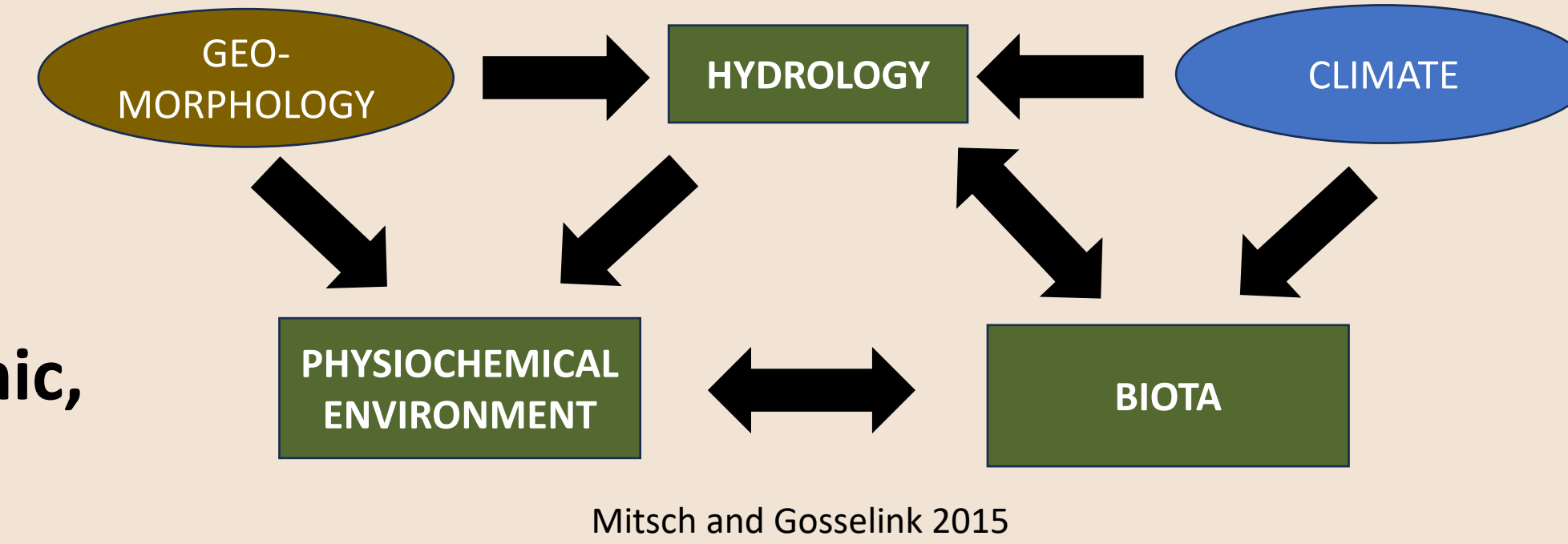
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Background

- Hydrology, vegetation, and soils drive wetland structure and function
- Unique combinations of these attributes are associated with individual wetland classification types
- Previous studies indicate that wetland classification type variation may be poorly understood due to lack of long-term datasets
- The focus of this research is to further understand the landscape, geomorphic, and/or structural features that best explain hydrologic similarity (and differences) among individual wetland classifications**



Objectives

- Quantify wetland hydrologic variation for inter and intra wetland classification types
- Identify geomorphic drivers for hydrological variation
- Provide guidance for reference wetland selections



Cypress Wetland 1
9.02 hectares
2,768 m perimeter
1.5 m depth



Cypress Wetland 2
2.35 hectares
598 m perimeter
2.74 m depth



Cypress Wetland 3
0.4 hectares
229 m perimeter
4.76 m depth



Cypress Wetland 4
15.66 hectares
3,135 m perimeter
1 m depth

== Hydrologic Similarity?

Methods

Reference Wetlands with Hydrologic Data Period of Record > 17 Years

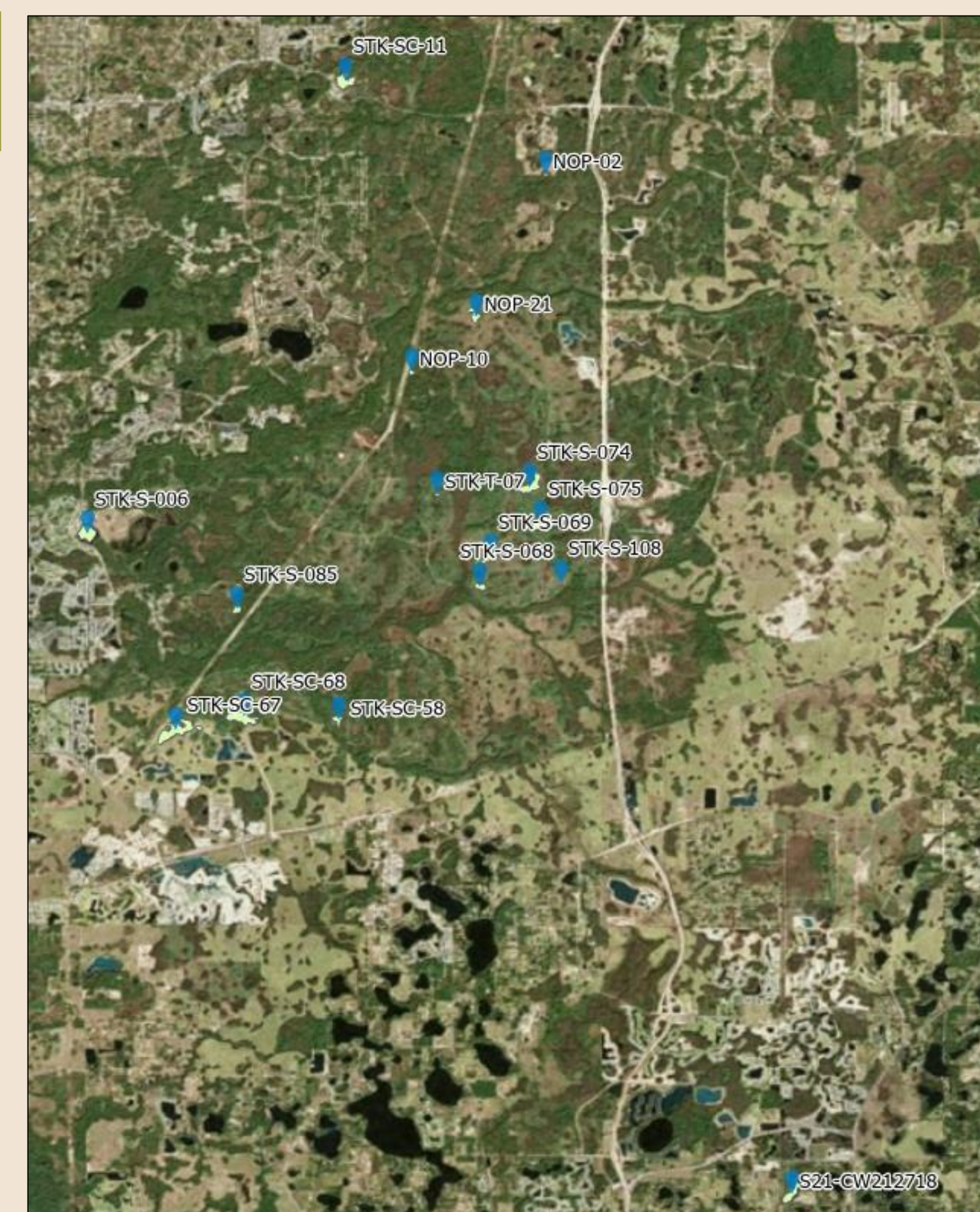
Are Inter- and Intra-Wetland Classifications Different Based on Hydrology?

How Do Geomorphic Factors Influence Hydrology?

Correlation Tables

Kruskal Wallace with Pairwise Comparison

PCA



Map 1 – Locations of reference cypress wetlands

Results

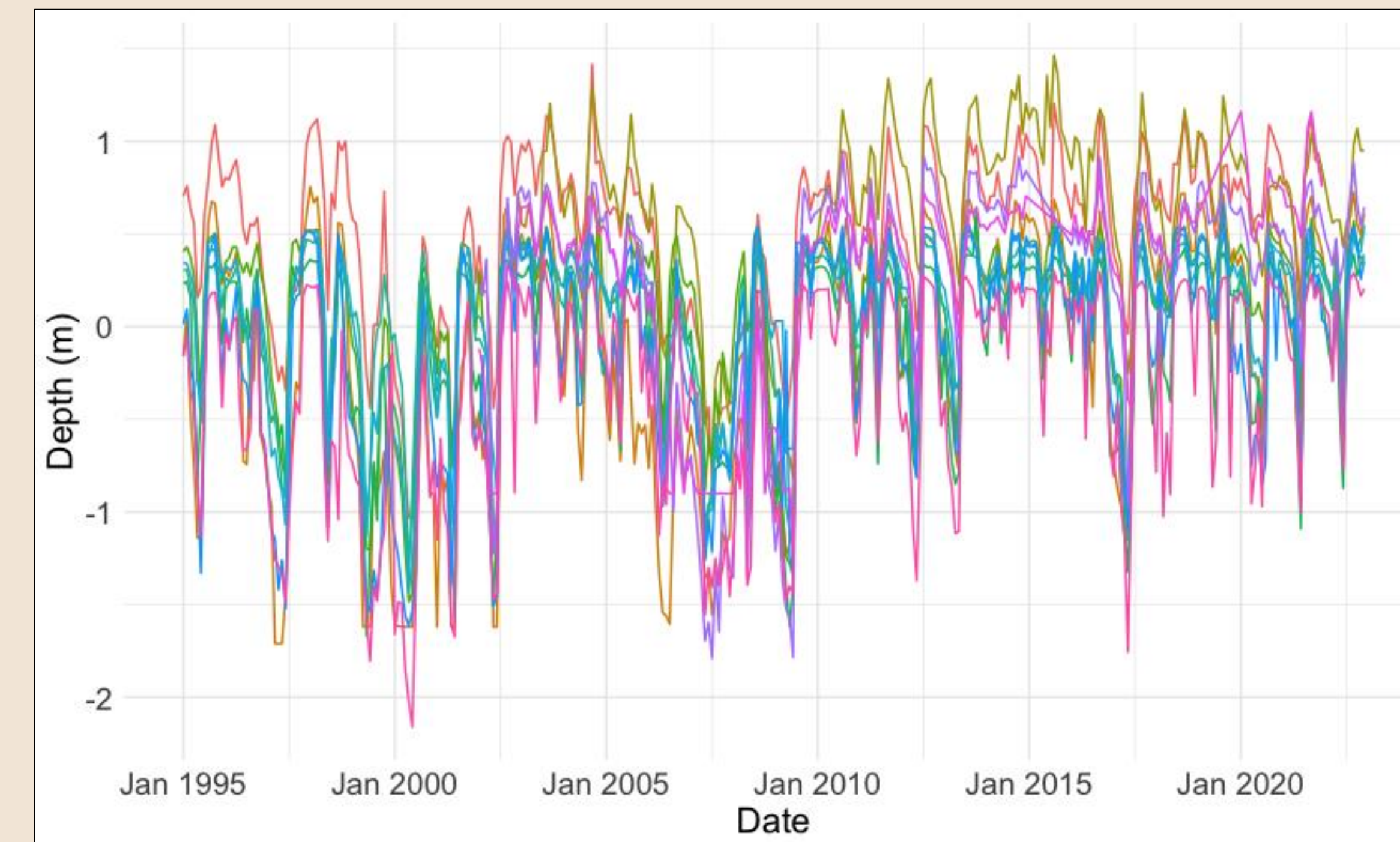


Figure 1 – Hydrograph showing variability among wetlands. Stage values > 0 m indicate presence of standing water.



Figure 2 – Correlation matrix for ecohydrologic metrics among wetlands, ranging from 0.59 to 1.

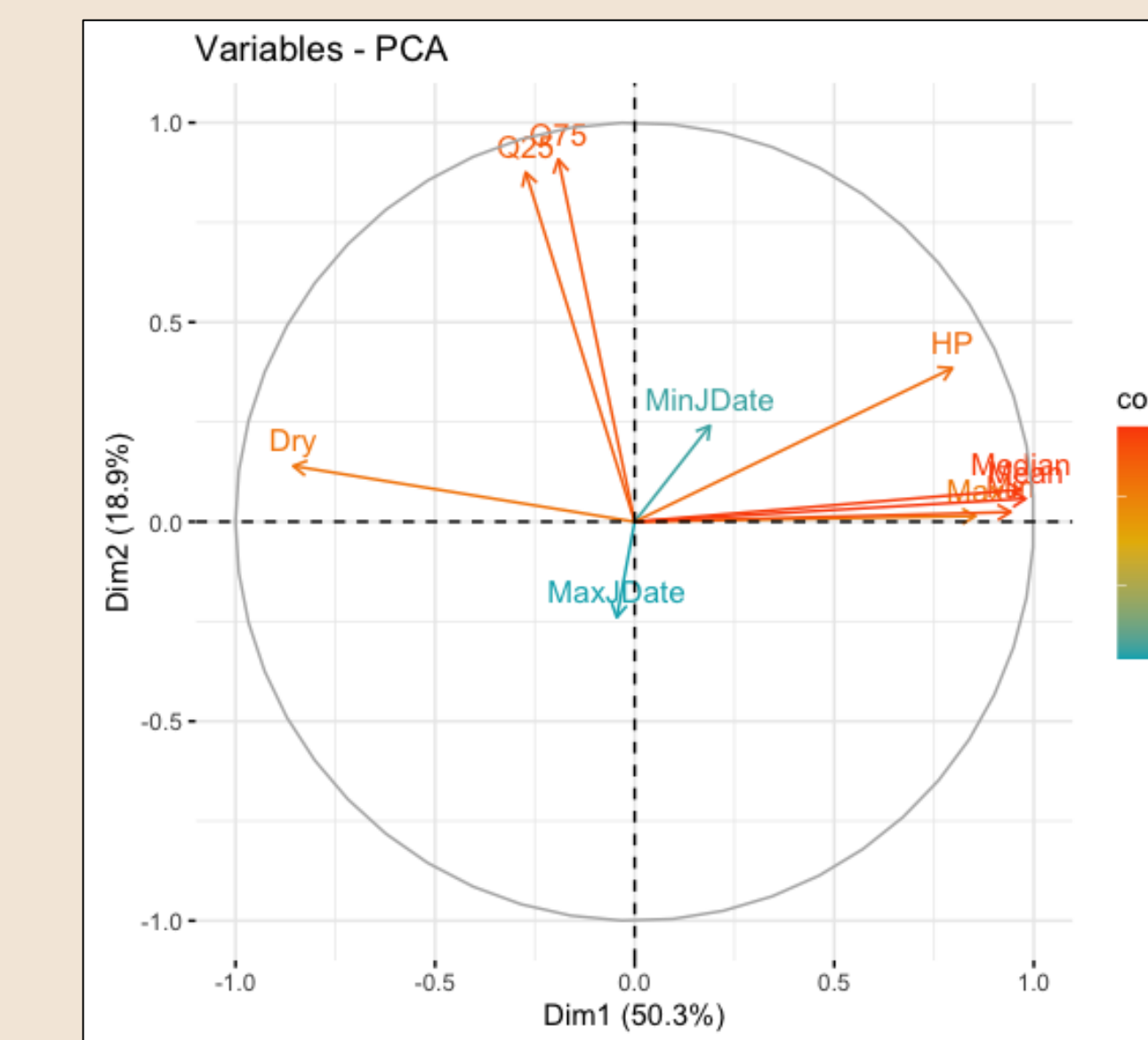


Figure 3 – PCA analysis of period of record ecohydrologic metrics with mean and median as dimension 1 and 2, respectively.

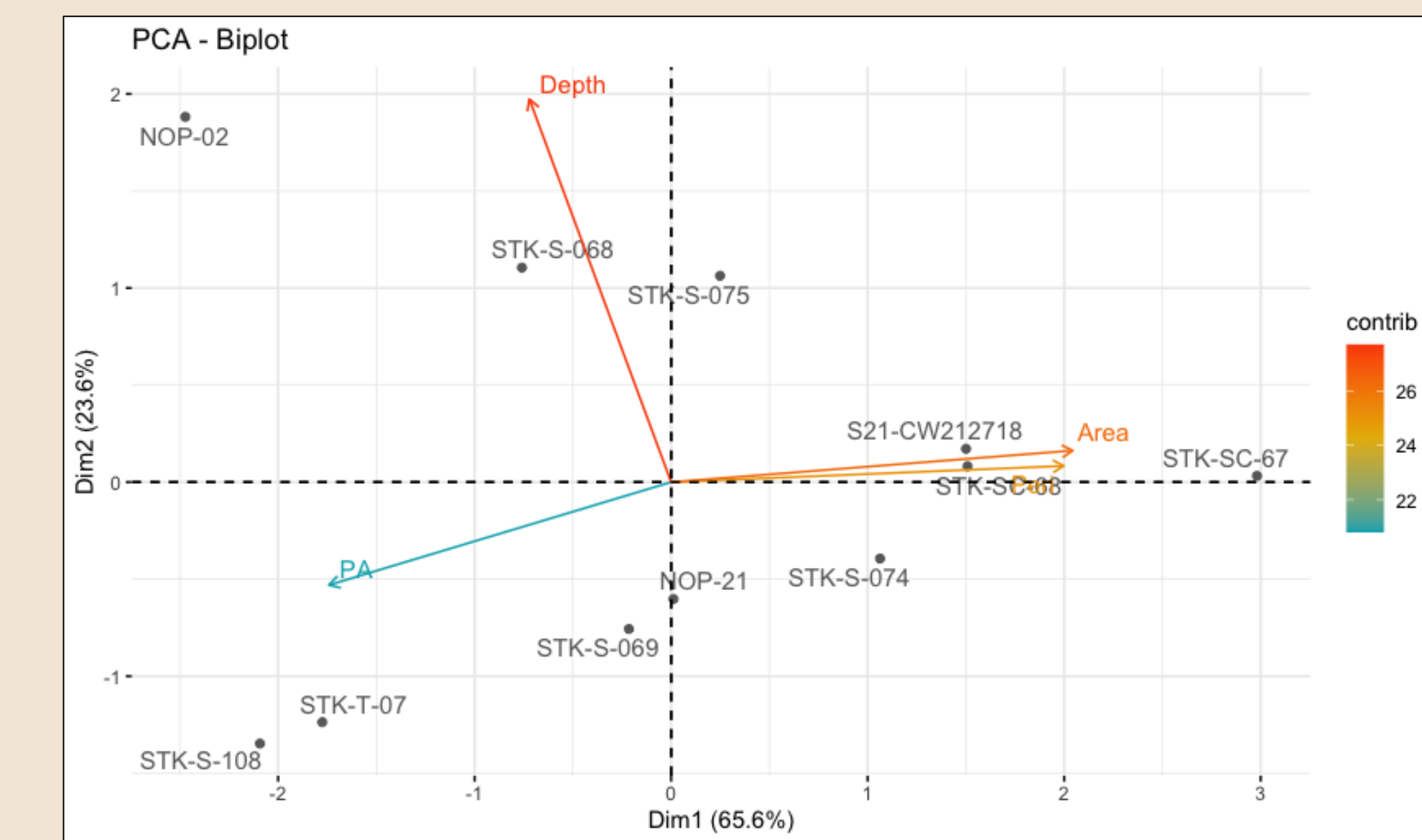


Figure 4 – PCA analysis of wetland geomorphic characteristics, with depth and area as dimension 1 and 2, respectively.

Ecohydrologic Metric		Range	Kruskal-Wallis (p-value)	Pairwise Comparison (Difference)
Magnitude (m)	Mean	-1.21 to 2.32	0.000	50%
	Median	-1.61 to 2.37		
	Minimum	-2.38 to 1.80		
	Maximum	0.01 to 3.02		
Timing (Julian Date)	Min Water Level	2 to 366	0.1314	
	Max Water Level	1 to 365		
Duration (Events)	< 25 th Percentile	5 to 14	0.000	12.5%
	>75 th Percentile	4 to 14		
Frequency (Events)	Wet	1 to 37	0.000	20%
	Dry	0 to 41		

Table 1 – Range, Kruskal-Wallis p-values, and pairwise comparison percent differences for collective ecohydrologic metrics, demonstrating hydrologic differences among wetlands of the same classification type.

Conclusions and Future Research

- Hydrologic variation occurs within the same wetland classification type
- Wetland water levels of isolated cypress wetlands exhibit a moderate to strong correlation ($r = 0.5$ to 1 ; Figure 1)
- Similarity of wetland hydrologic regime are driven by mean and median (Figure 3)
- Wide variation of wetland geomorphic features driven by depth and area (Figure 4)

Next steps...

- Determine relationship between wetland geomorphic features and hydrologic regime
- Expand analysis to other wetland classification types (i.e., marsh, wet prairie, and cypress marsh combination wetlands), as well as wetlandscape attributes (i.e., distance to other water bodies and surrounding land use)
- Evaluate how climate contributes to ecohydrologic metric variation

Acknowledgements

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Poff, N.L., Allan, J.D., Bain, M.B., Karr, J.R., Prestegard, K.L., Richter, B.D., Sparks, R.E. and Stromberg, J.C., 1997. The natural flow regime. *BioScience*, 47(11), pp.769-784.

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