



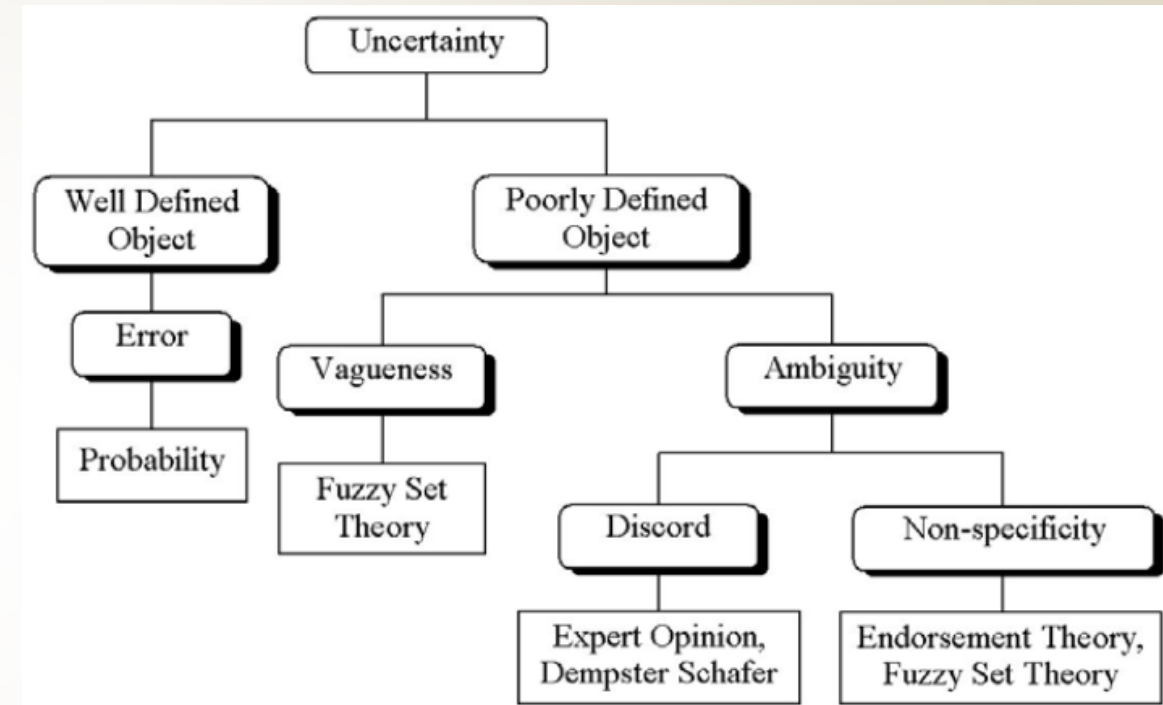
Visualizing Uncertainty Metrics Across Multiple Attribute Resolutions

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Uncertainty



Comber et al., 2006



Quantification and visualization of spatial and temporal uncertainty within wetlands.



<https://nhpbs.org/natureworks/nwep7f.htm>



<https://www.fws.gov/southeast/gulf-restoration/next-steps/focal-area/prairie-potholes/>

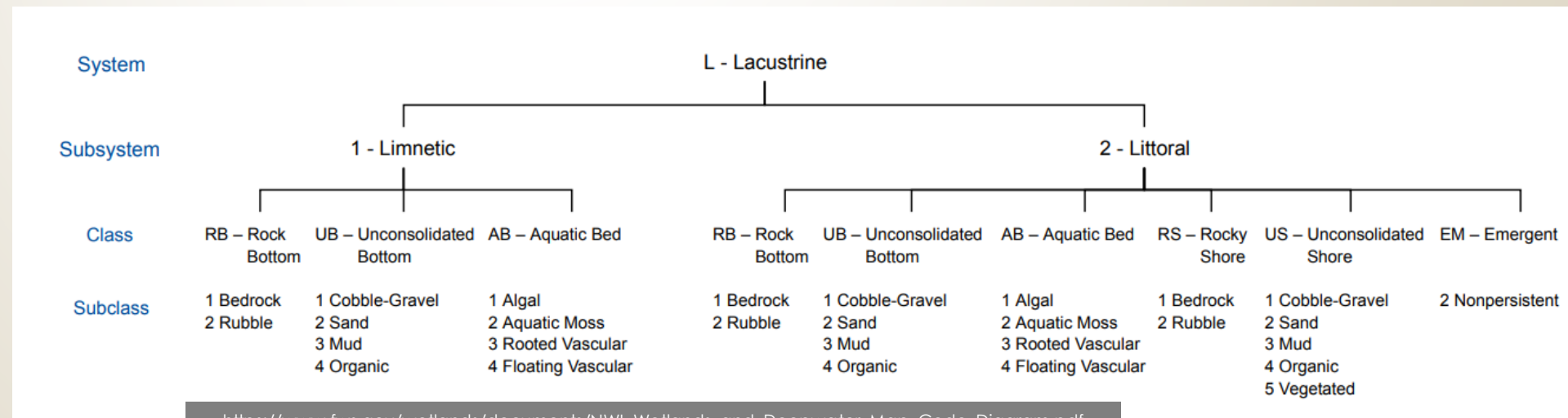
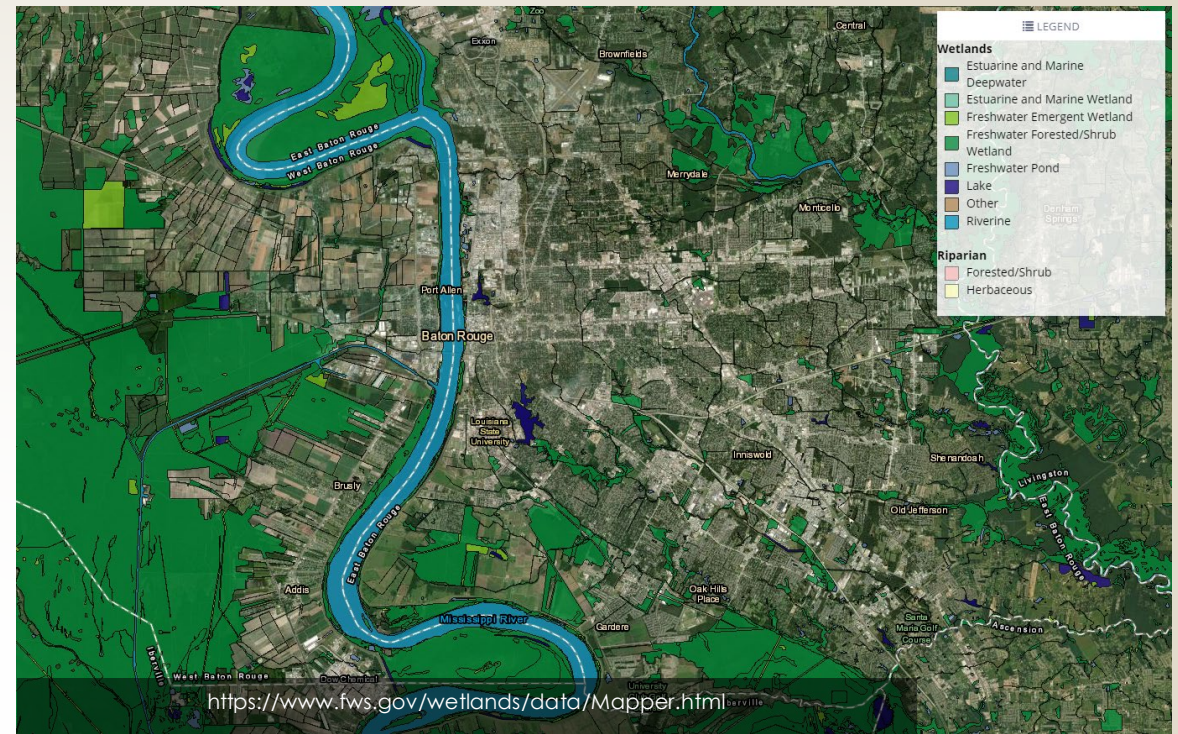
Wetlands



<https://www.nps.gov/bith/learn/nature/wetlands.htm>

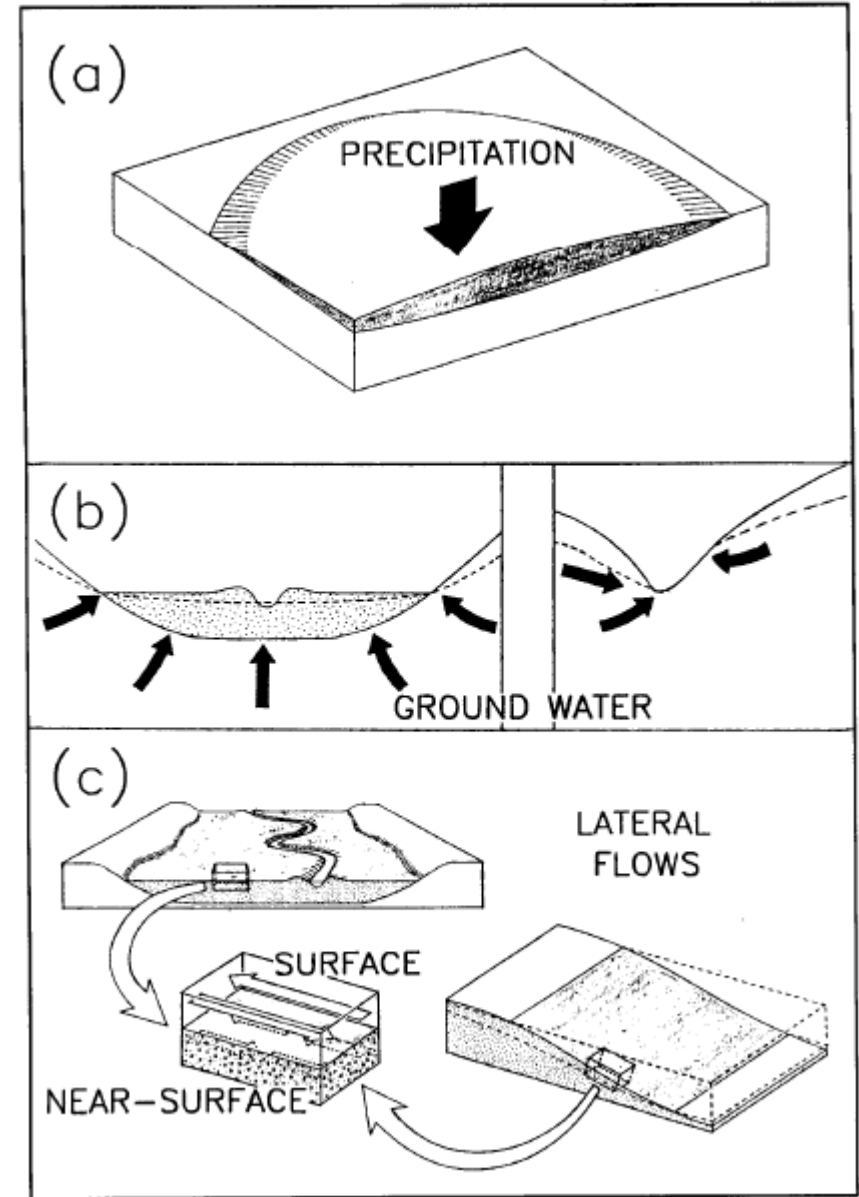
Wetland Classification

- Cowardin
 - Marine
 - Estuarine
 - Riverine
 - Lacustrine
 - Palustrine



Wetland Classification

- ▶ Hydrogeomorphic (HGM)
 - ▶ Depression
 - ▶ Tidal Fringe
 - ▶ Lacustrine Fringe
 - ▶ Slope
 - ▶ Mineral Soil Flats
 - ▶ Organic Soil Flats
 - ▶ Riverine

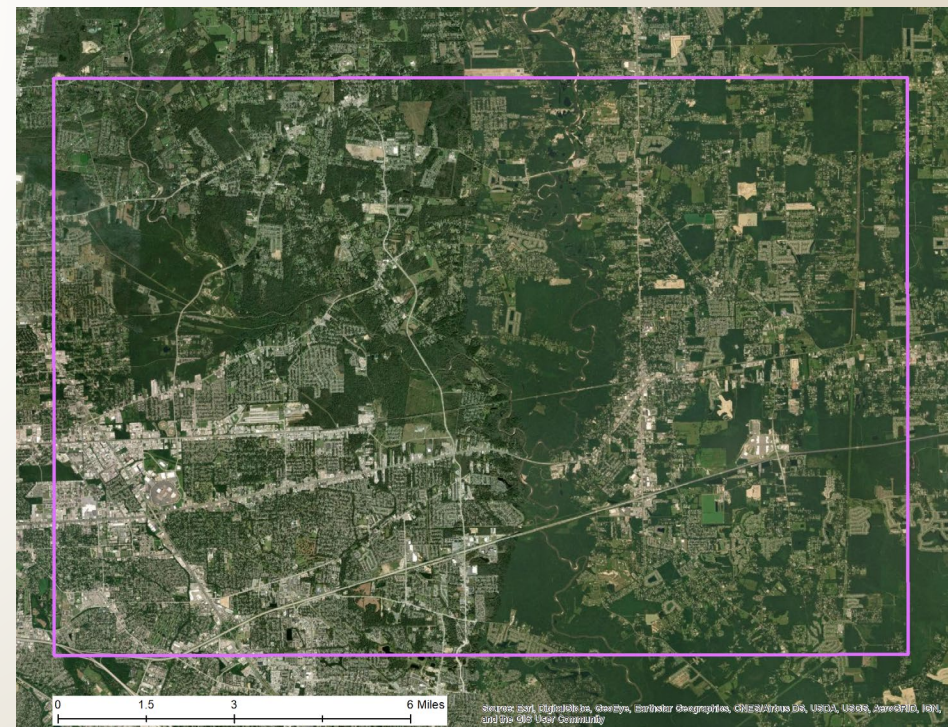
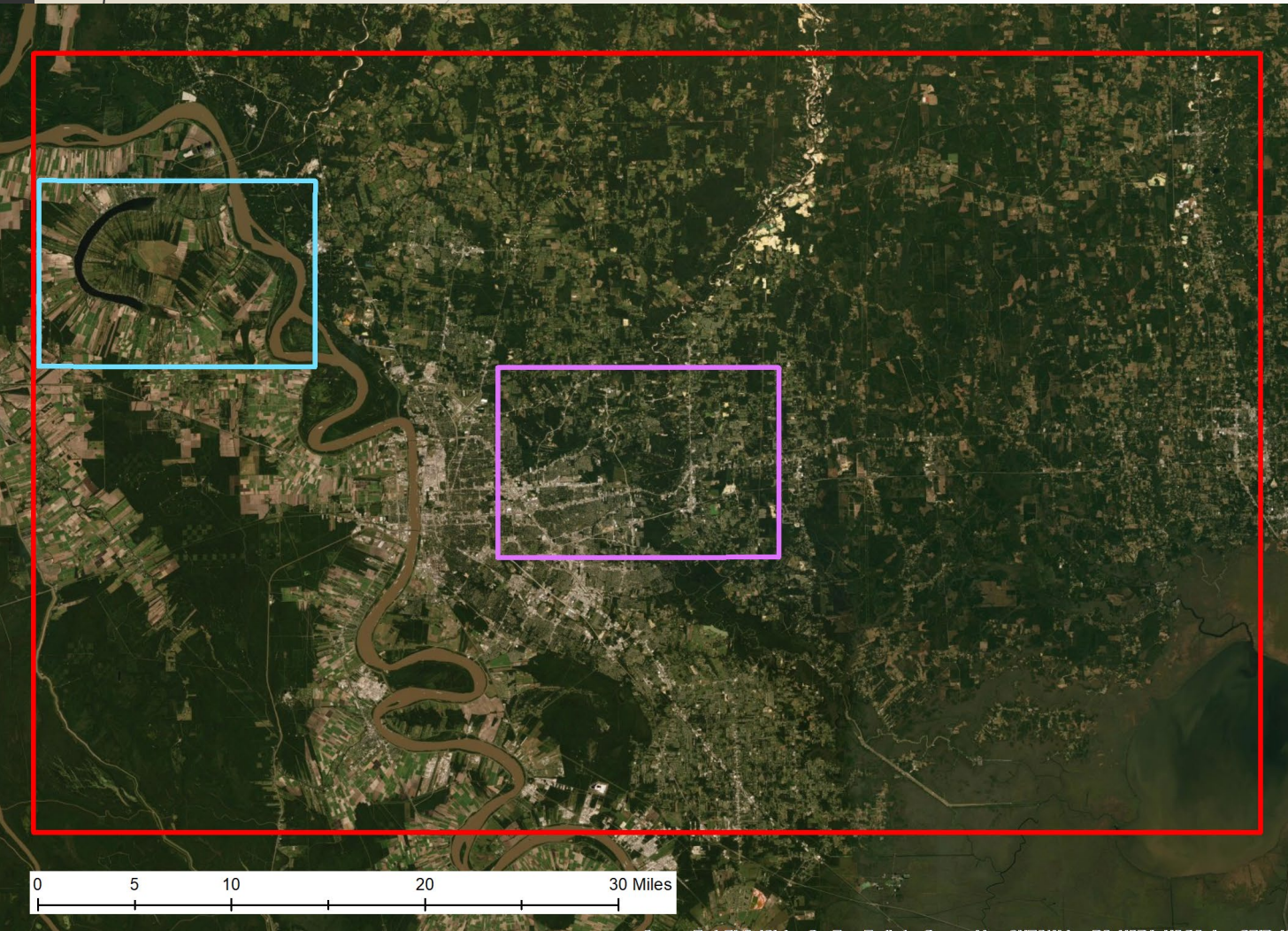




Uncertainty within wetlands?



Study Area



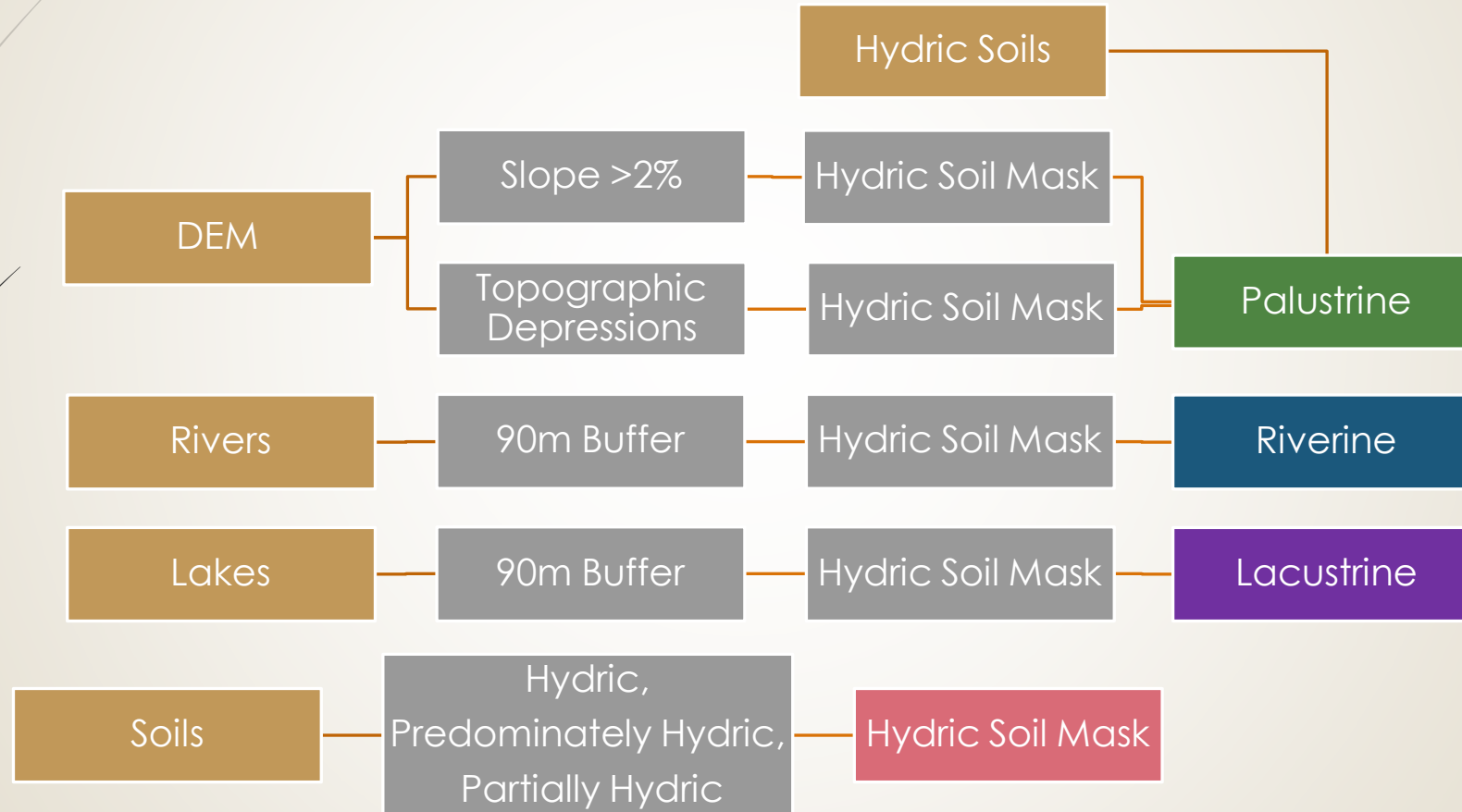


Data





Table 1- Data Layers

Data Layer	Source	Resolution	Years collected
Elevation	USGS	3 meter	2016, 2018
Hydric soils	NRCS	1:20,000	2019
Hydrography	NHD-USGS	1:24,000	2000-2019
Wetlands	NWI-FWS	1:65,000	1970s, 1980s, 2010s




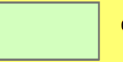


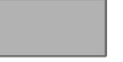









HGM Creation



Confusion Matrices

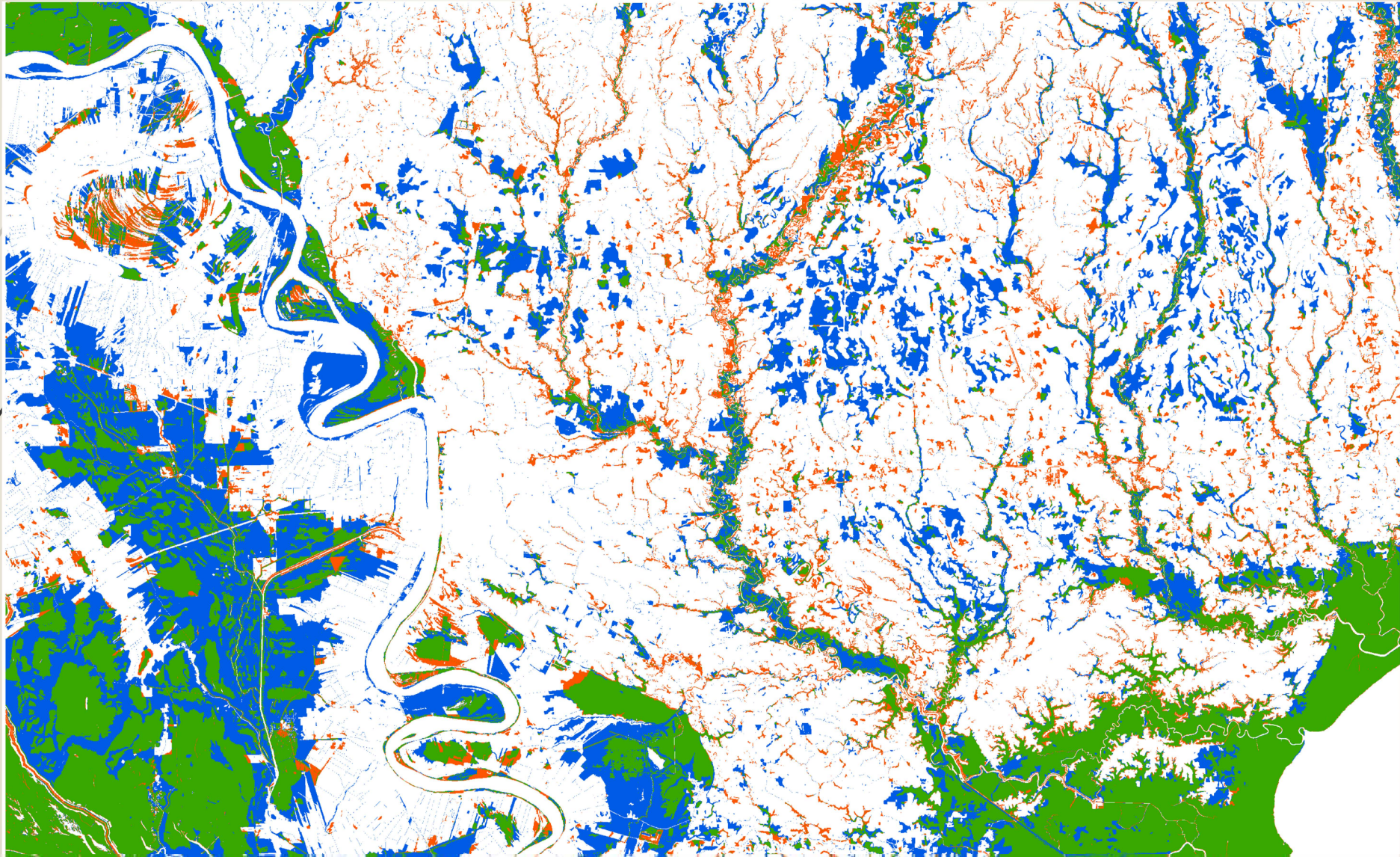
	True Negative
	False Negative
	False Positive
	True Positive

Confusion matrix for coarse attribute resolution
Binary wetland/non-wetland

		HGM (Test Data)				
		No Wetland	Riverine	Lacustrine	Palustrine	
NWI (Validation Data)	No Wetland	 %	 %	 %	 %	False Positives
	Riverine	 %	 %	 %	 %	
	Lacustrine	 %	 %	 %	 %	
	Palustrine	 %	 %	 %	 %	
False Negatives					True Positives/Negatives	

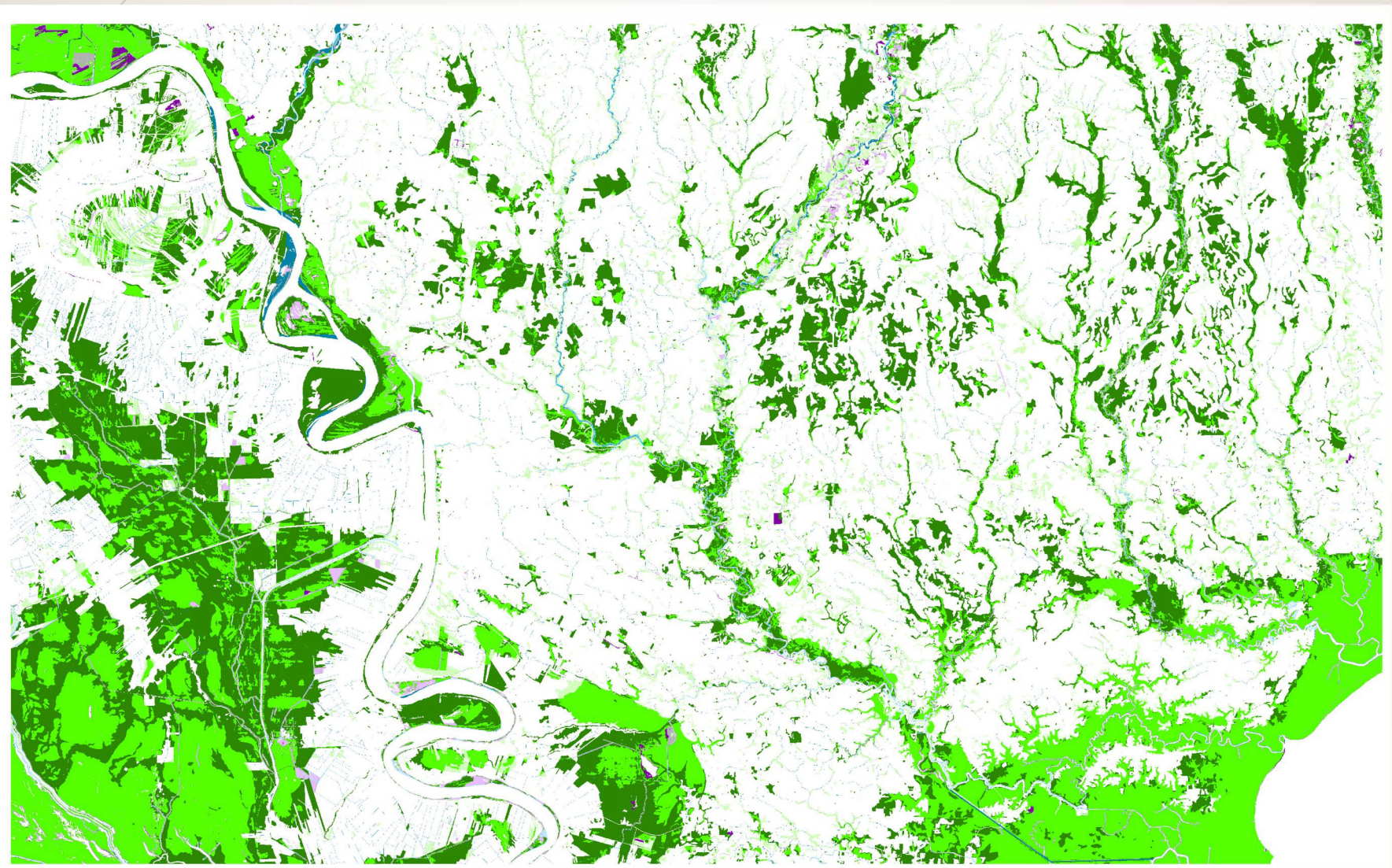
Confusion matrix for coarse and fine attribute resolution
Binary wetland/non-wetland and classification of wetland type

True Negative	%65.4
False Negative	%15.5
False Positive	%5.4
True Positive	%13.8



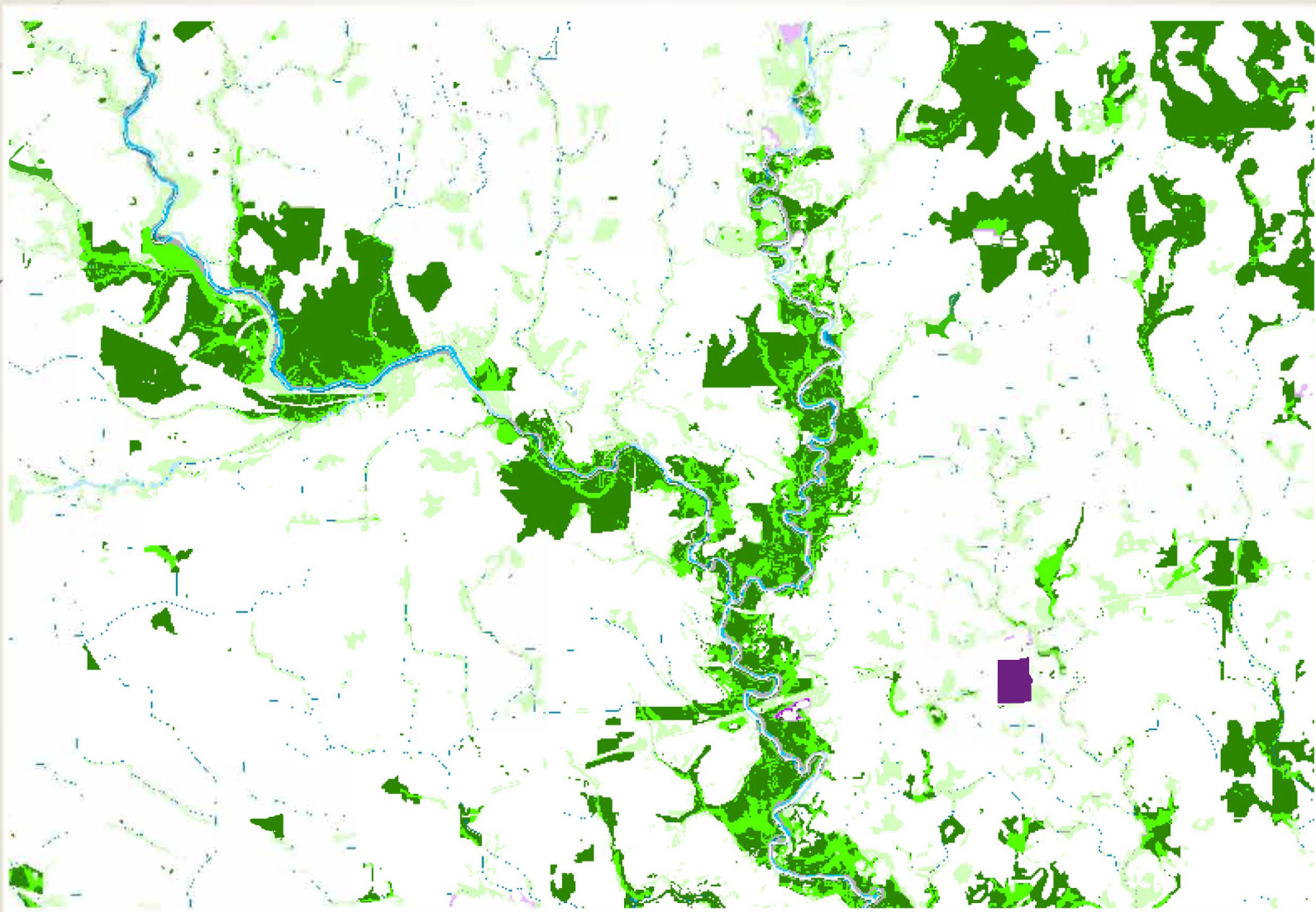


		HGM			
		No Wetland	Riverine	Laucustrine	Paulistrine
NWI	No Wetland	%65.4	%0.5	%0.24	%4.6
	Riverine	%0.6	%0.08	%0.003	%0.2
	Laucustrine	%0.09	%0.003	%0.008	%0.06
	Paulistrine	%14.7	%0.6	%0.1	%12.7



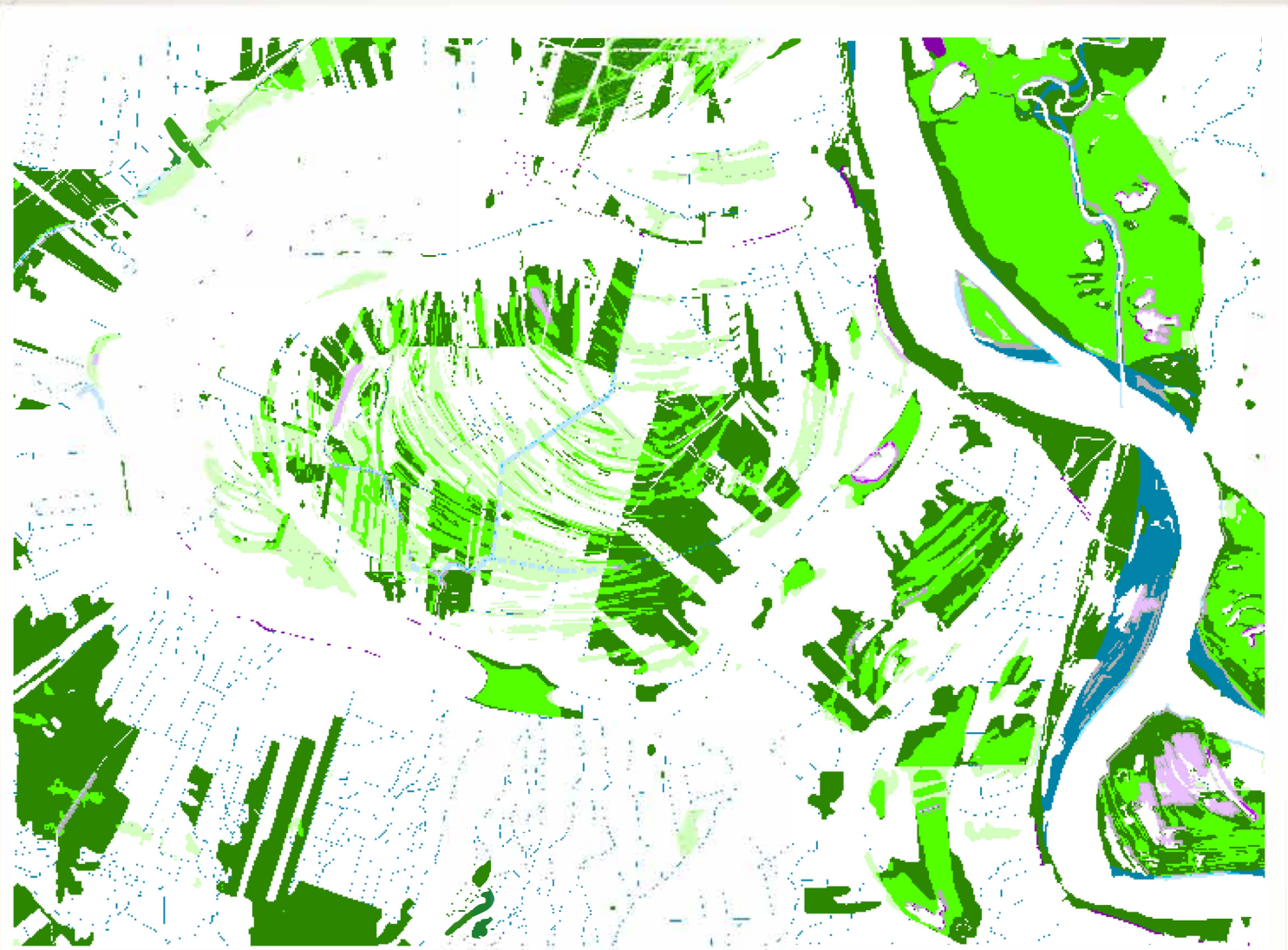


		HGM			
		No Wetland	Riverine	Laucustrine	Paulistrine
NWI	No Wetland	%75.6	%0.4	%0.08	%7.2
	Riverine	%0.5	%0.26	%0	%0.3
	Laucustrine	%0.1	%0	%0.005	%0.005
	Paulistrine	%11.5	%0.36	%0.018	%3.6





		HGM			
		No Wetland	Riverine	Laucustrine	Paulistrine
NWI	No Wetland	%66.9	%0.4	%0.43	%5.5
	Riverine	%1.9	%0.05	%0.03	%0.3
	Laucustrine	%0.12	%0	%0.03	%0.04
	Paulistrine	%14.3	%0.3	%0.2	%9.5



Future Research and Benefits

- ▶ Temporal Dimension
- ▶ Additional study areas
- ▶ Open Source Software Tool



Thank you



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- ▶ Additional Questions can be directed to:
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