

# Vegetation and soil development in restored tidal freshwater wetlands: Lessons from the Anacostia and Patuxent



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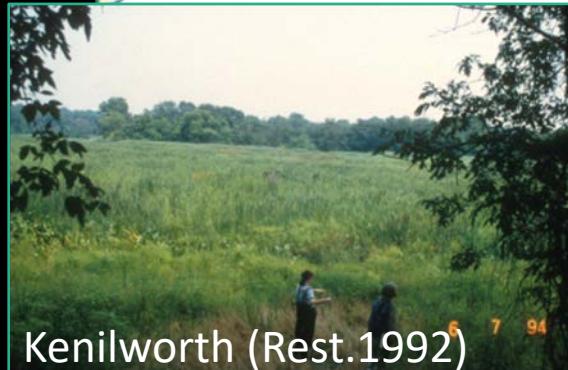
# Vegetation of tidal freshwater wetlands: Spatially and temporally variable



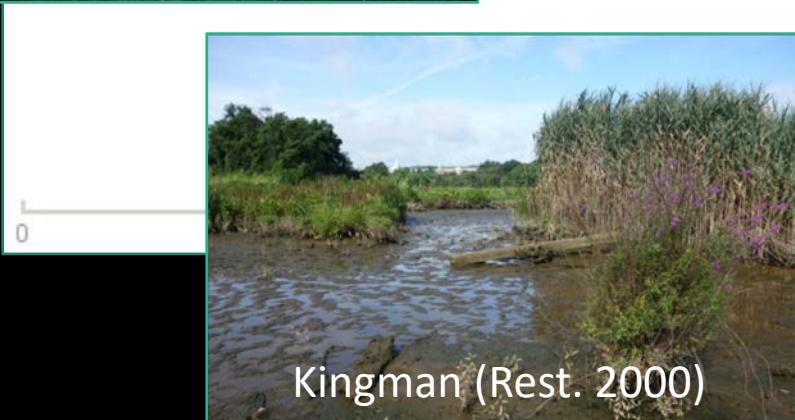
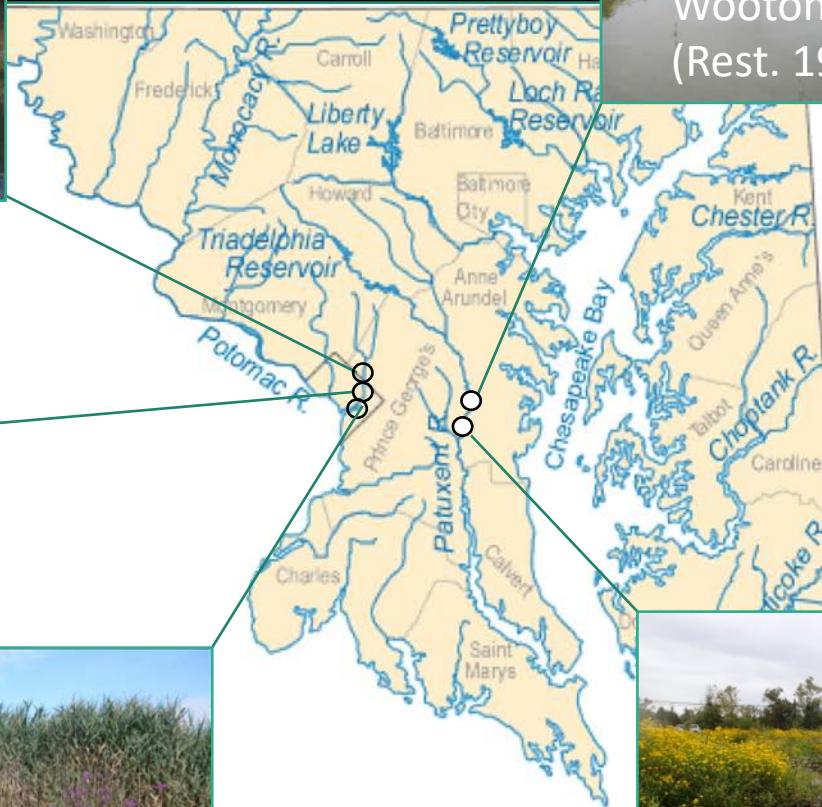
# Study sites



Dueling Creek (Natural)



Kenilworth (Rest. 1992)



Kingman (Rest. 2000)

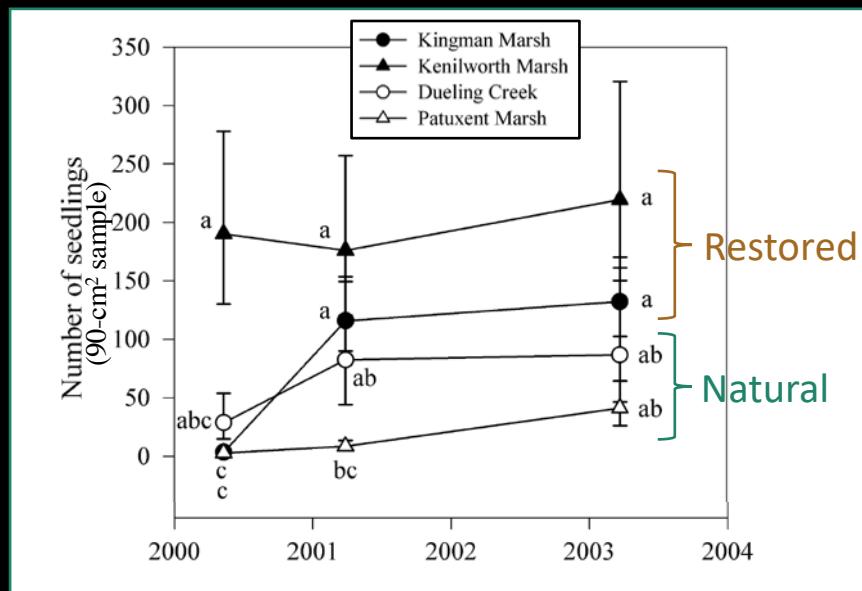


Wootons Landing  
(Rest. 1992)

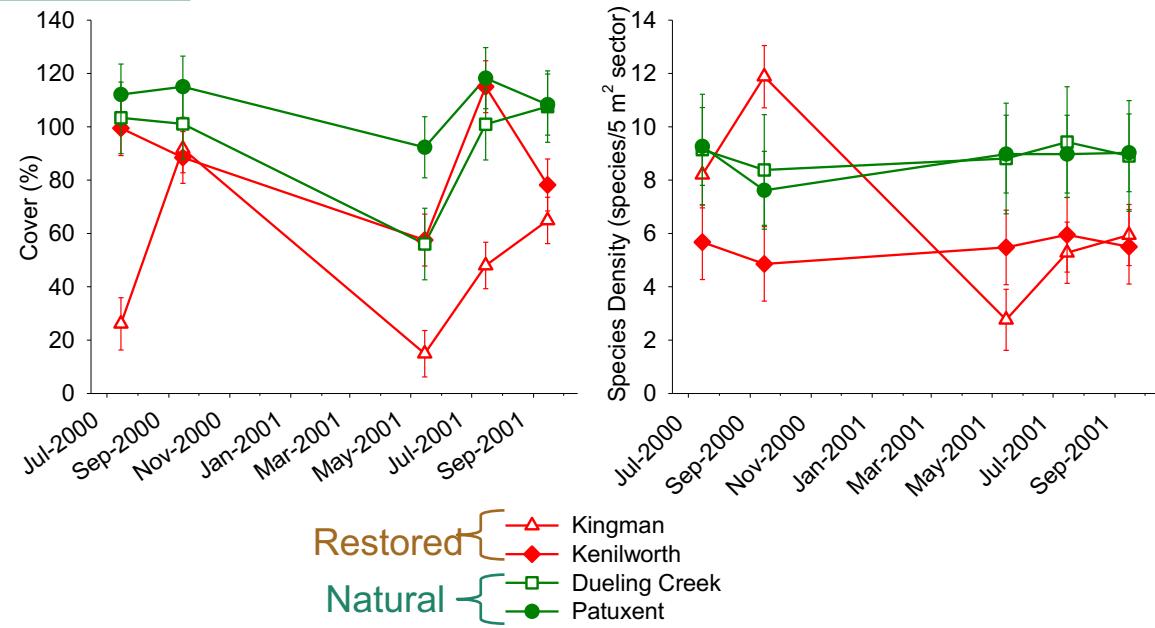


Patuxent/Jug Bay (Natural)

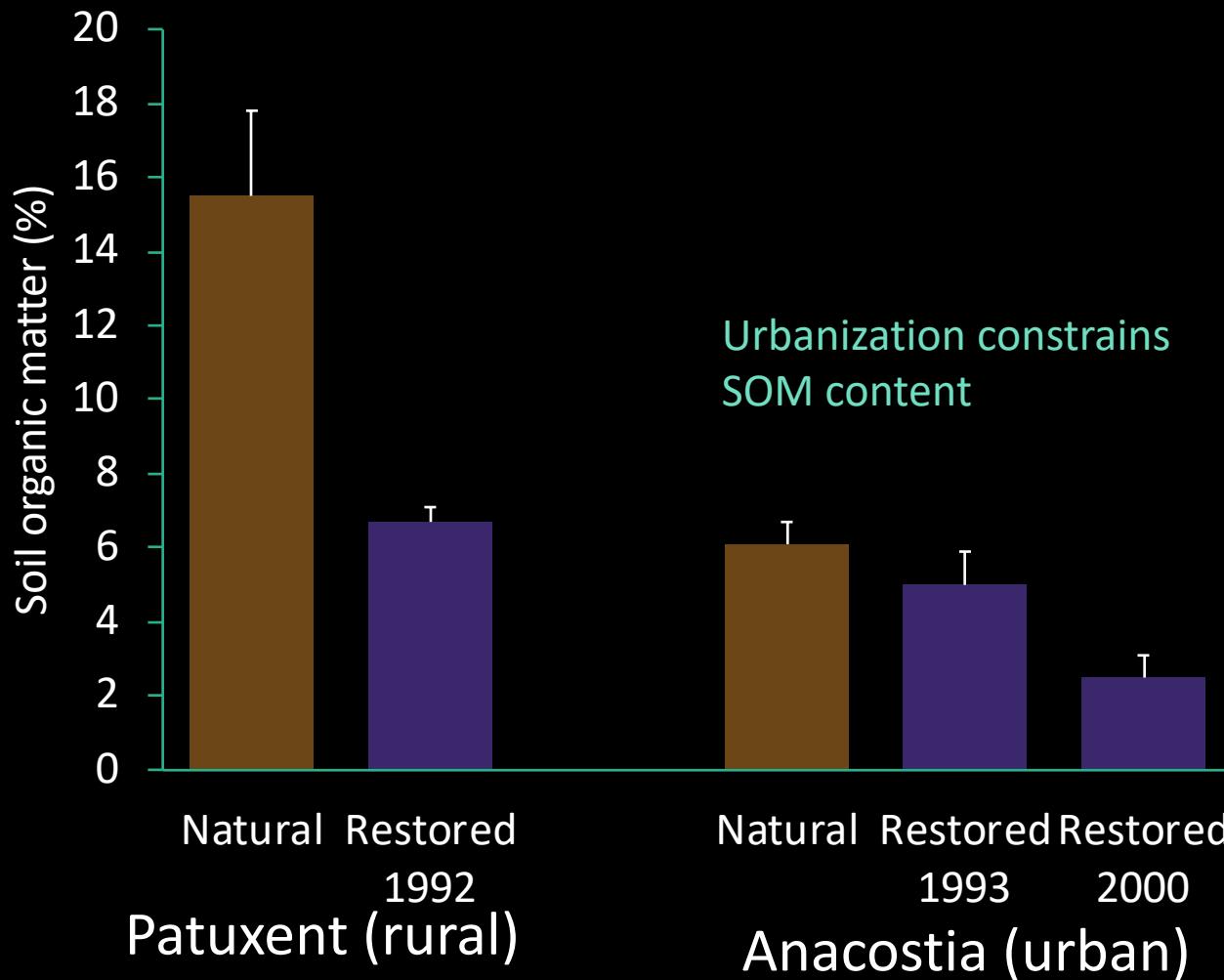
## Seed banks develop rapidly in restored sites



Neff et al. 2009, *Restoration Ecology*



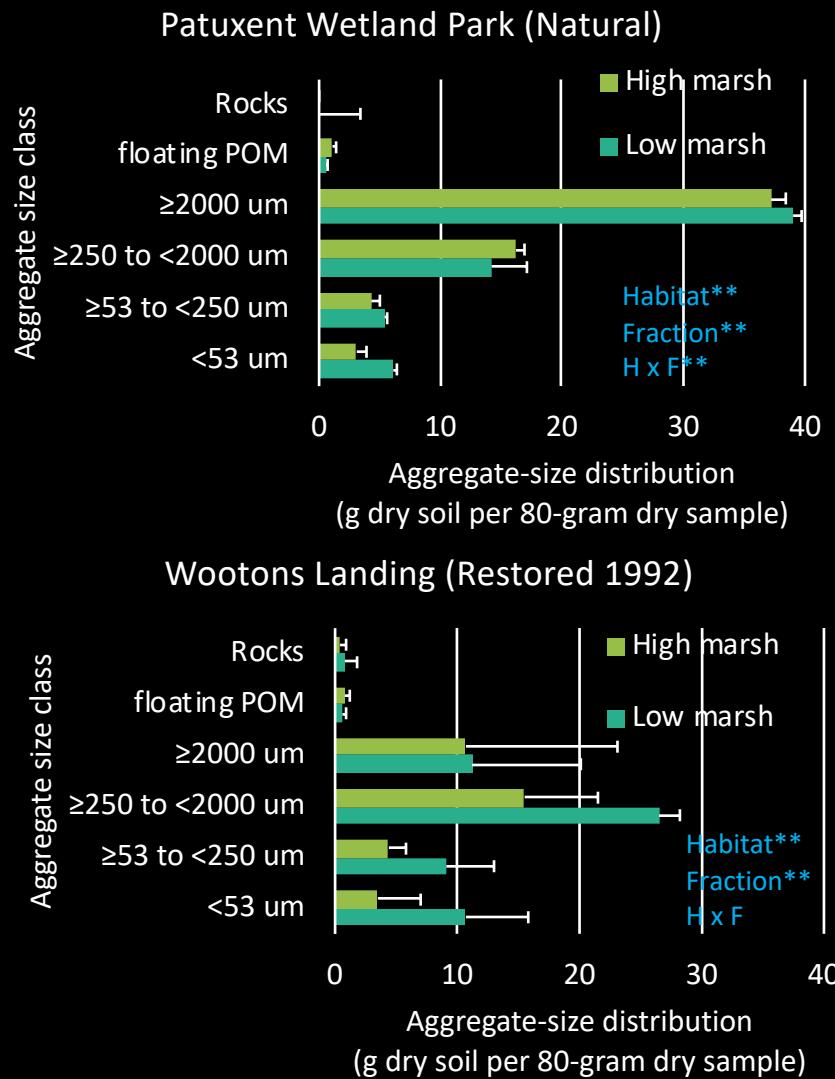
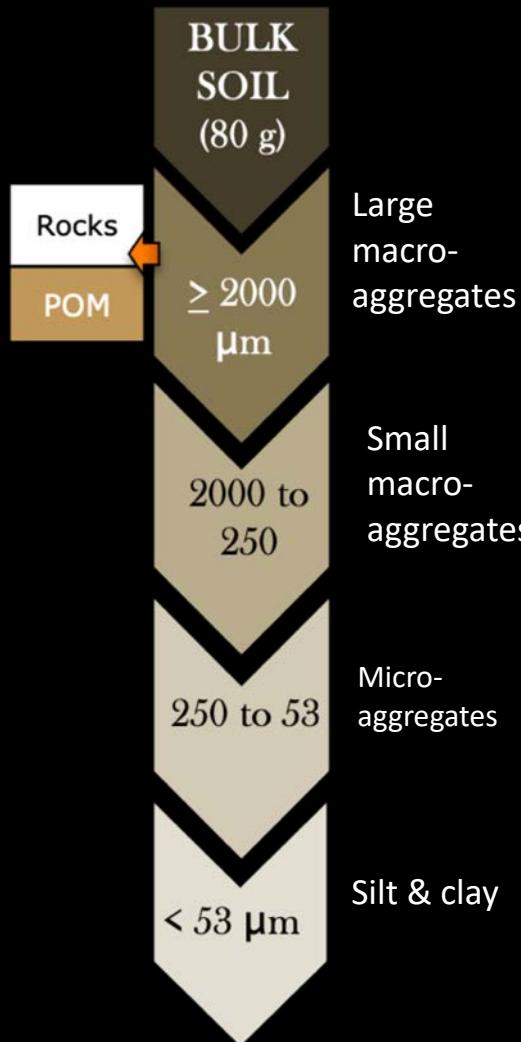
# Soil organic matter is slow to develop



Christine Maietta  
(Prasse)

# Soil aggregates: Key to organic matter stabilization?

Natural wetland soils have more large macroaggregates than restored



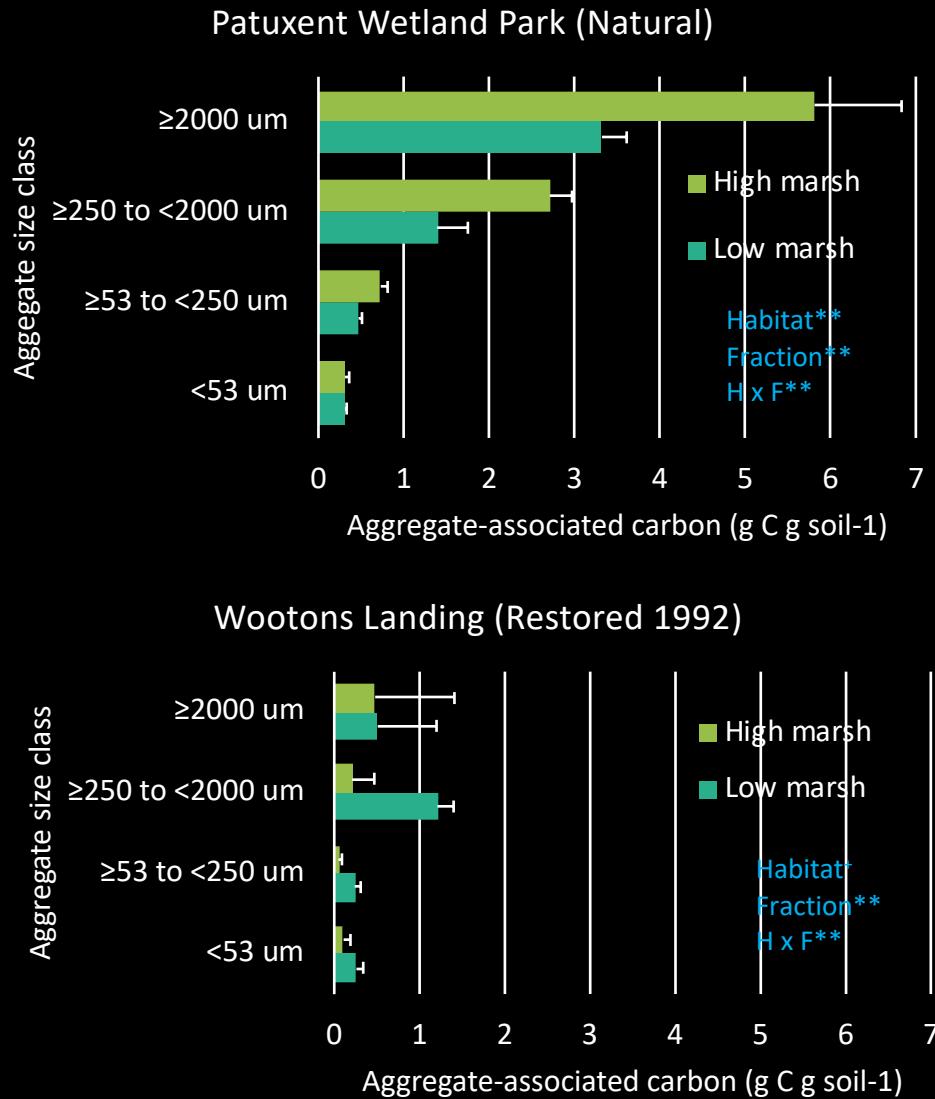
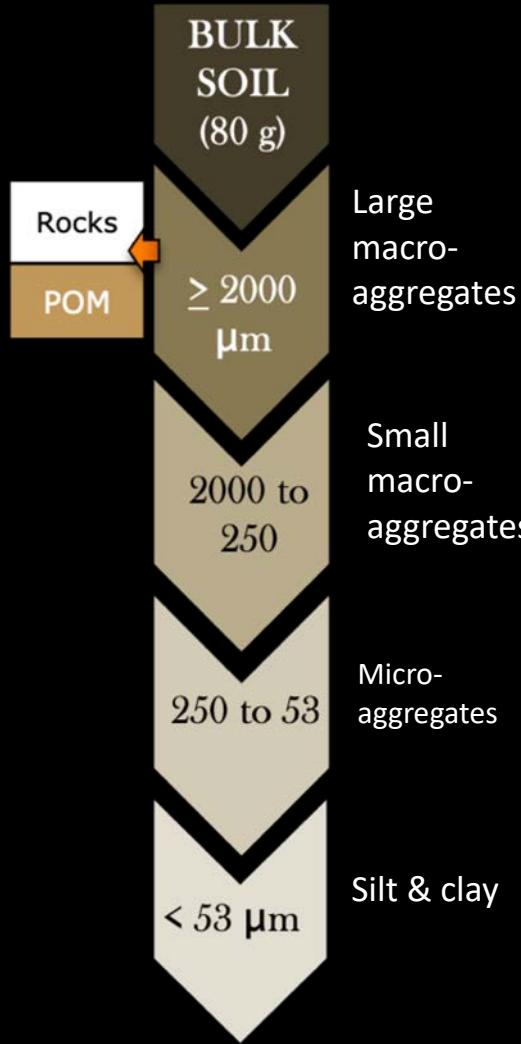
\*\*P<0.01

\*P<0.05

+P<0.1

Maietta  
et al.  
2019,  
SSSA  
Journal

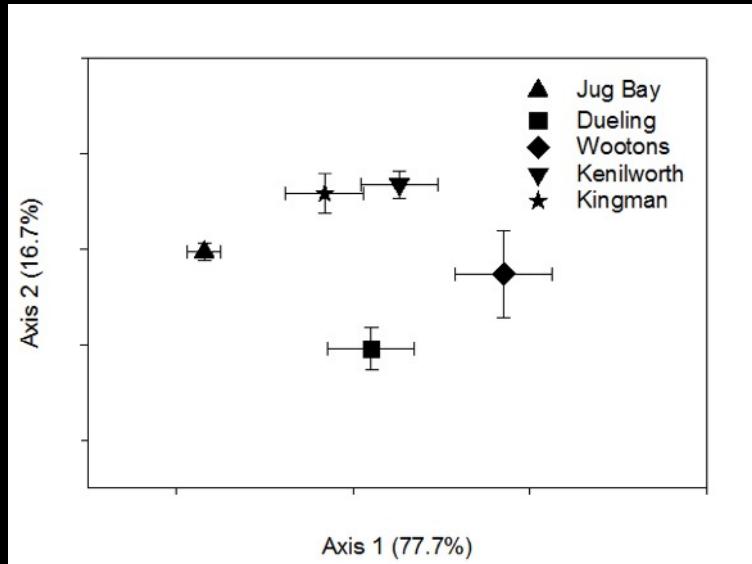
# Most carbon in natural wetland associated with large macroaggregates



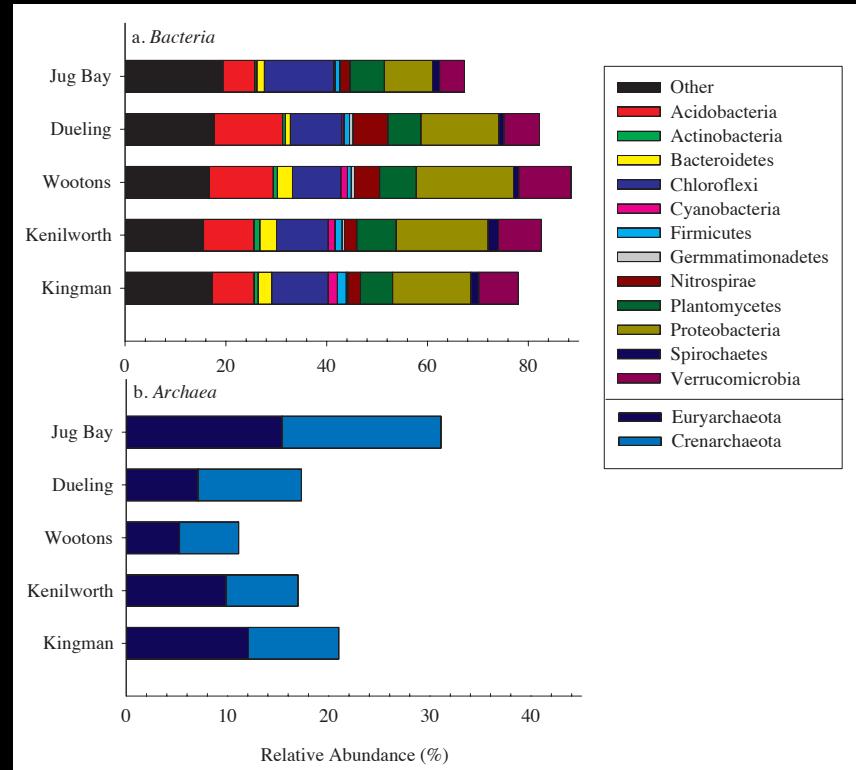
\*\*P<0.01  
\*P<0.05  
+P<0.1

Maietta et al. 2019, SSSA Journal

# Soil microbial communities vary between restored and natural sites

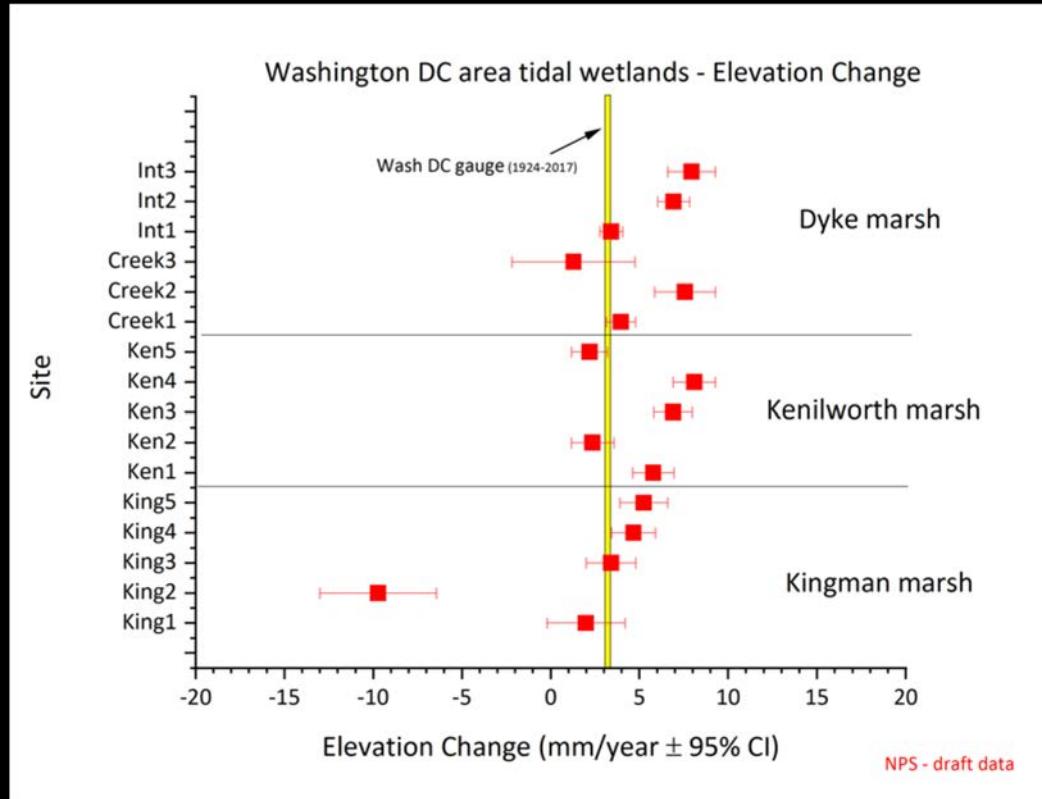


Stephanie Yarwood

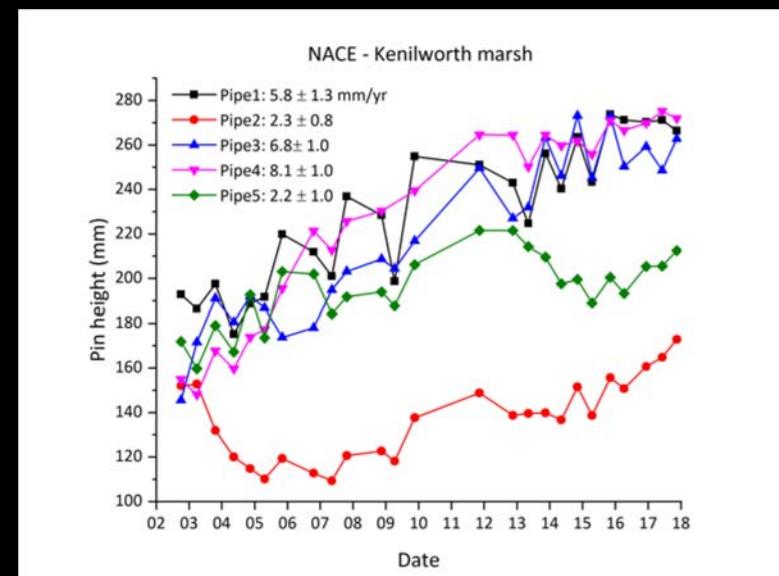


Prasse et al.,  
2015, *Appl.  
Env. Micr.*)

# Sea level and restored marshes



Draft SET data, courtesy Jim Lynch, NPS



# Conclusions

- Tidal freshwater wetlands
  - Plant communities diverse and spatiotemporally variable
  - Urbanization alters soil and vegetation
- Ecosystem development
  - Seed banks and vegetation establish quickly but differ from natural wetlands
  - Soil biogeochemical characteristics are slow to develop
    - Soil organic matter
    - Microbes
  - Keeping up with Relative SLR



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Thank you!