

Effects of Non-native *Procambarus clarkii* on Native Crayfish Populations in the Carolinas

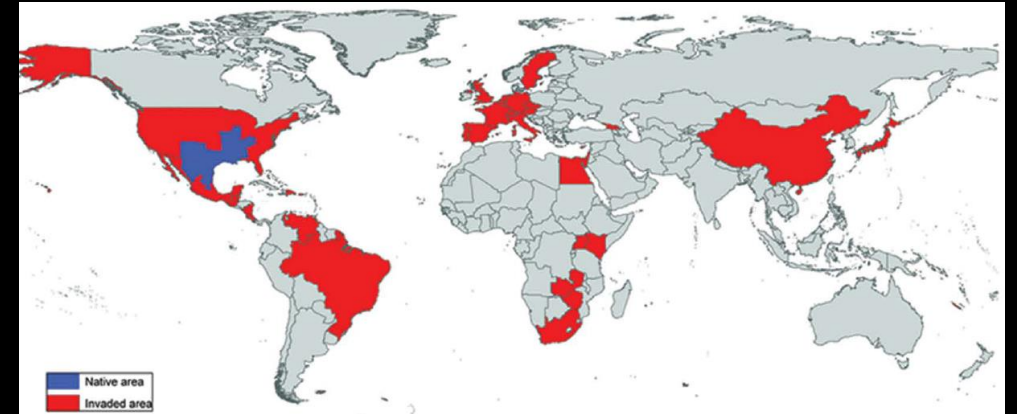
Kendrick¹, M.R., E.B. Underwood¹, B.W. Williams², and P.R. Kingsley-Smith¹

¹ SC Dept. Natural Resources; ² NC Museum of Natural Sciences



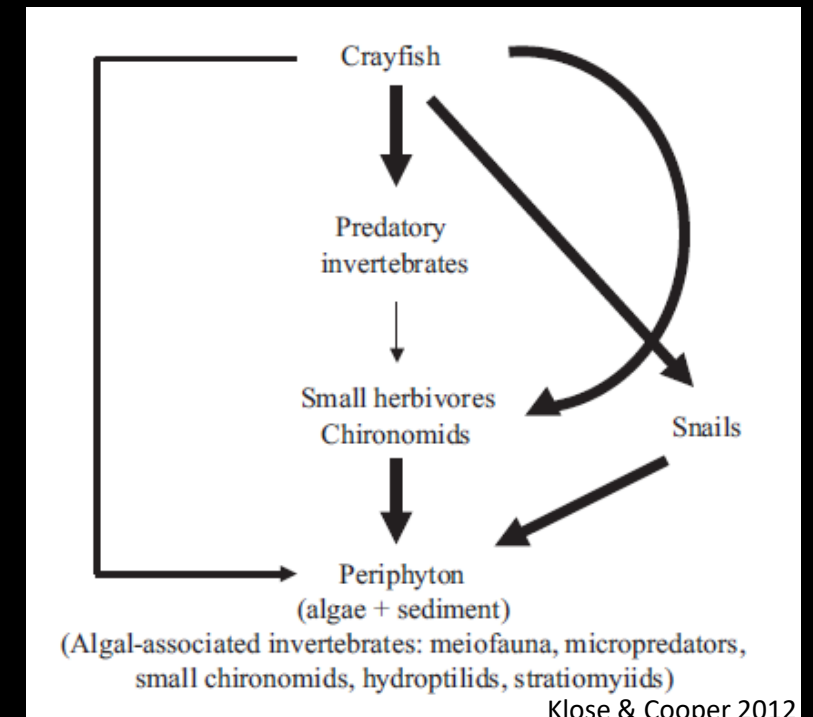
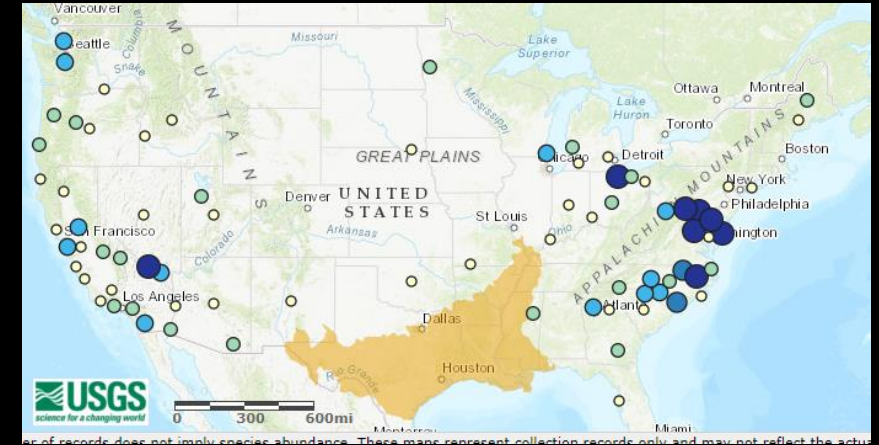
Global invader: *Procambarus clarkii*

- Aggressive omnivore
- Native to Gulf Coast and Mississippi River drainage
- Various means of introduction
 - Live study specimens for classrooms
 - Pet trade
 - Culinary discards
- Cause of “crayfish plague”, a fungal disease that has decimated native crayfish in Europe

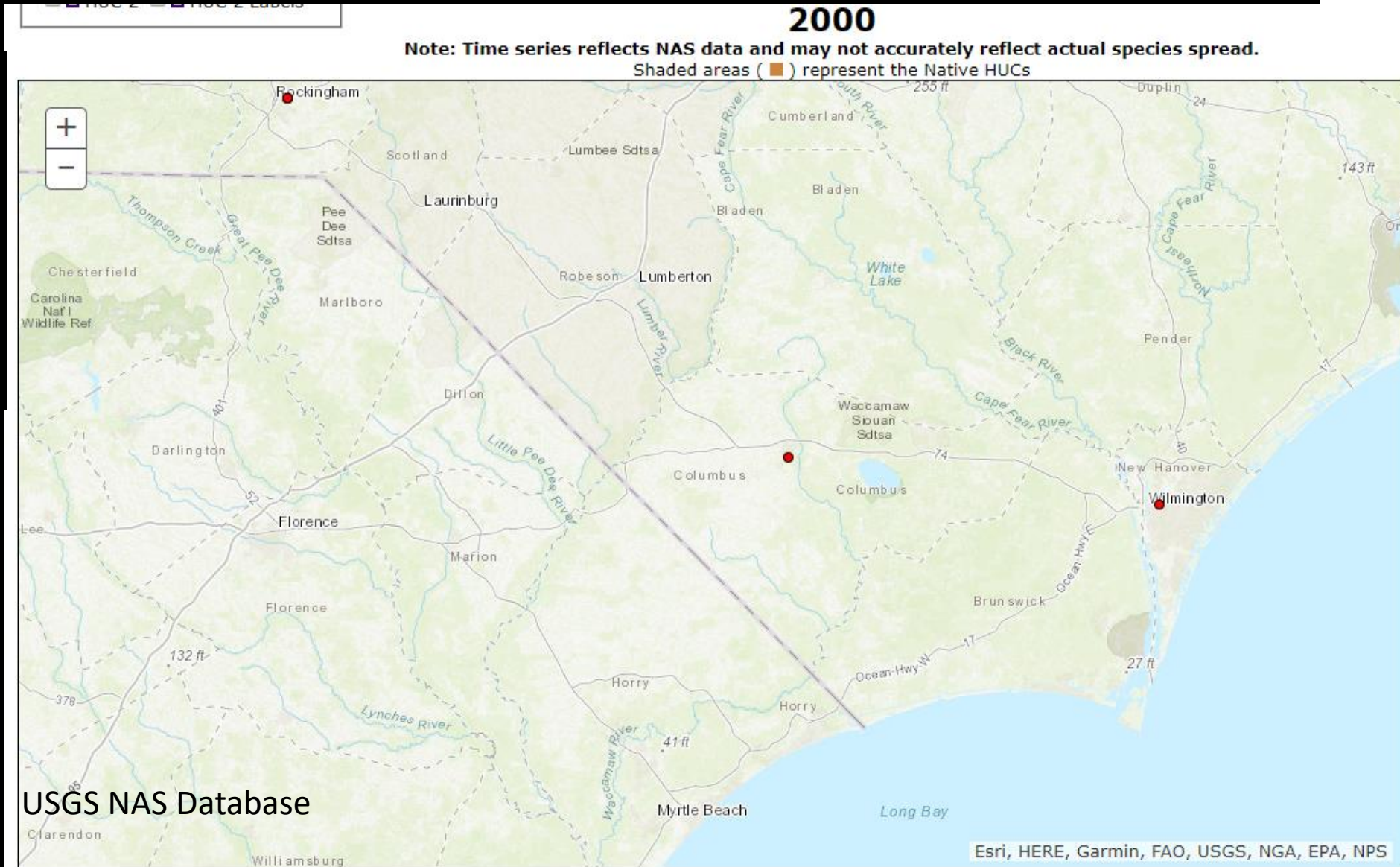
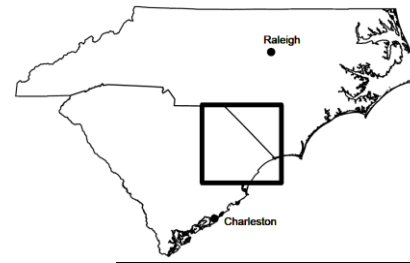


Substantial effects across US

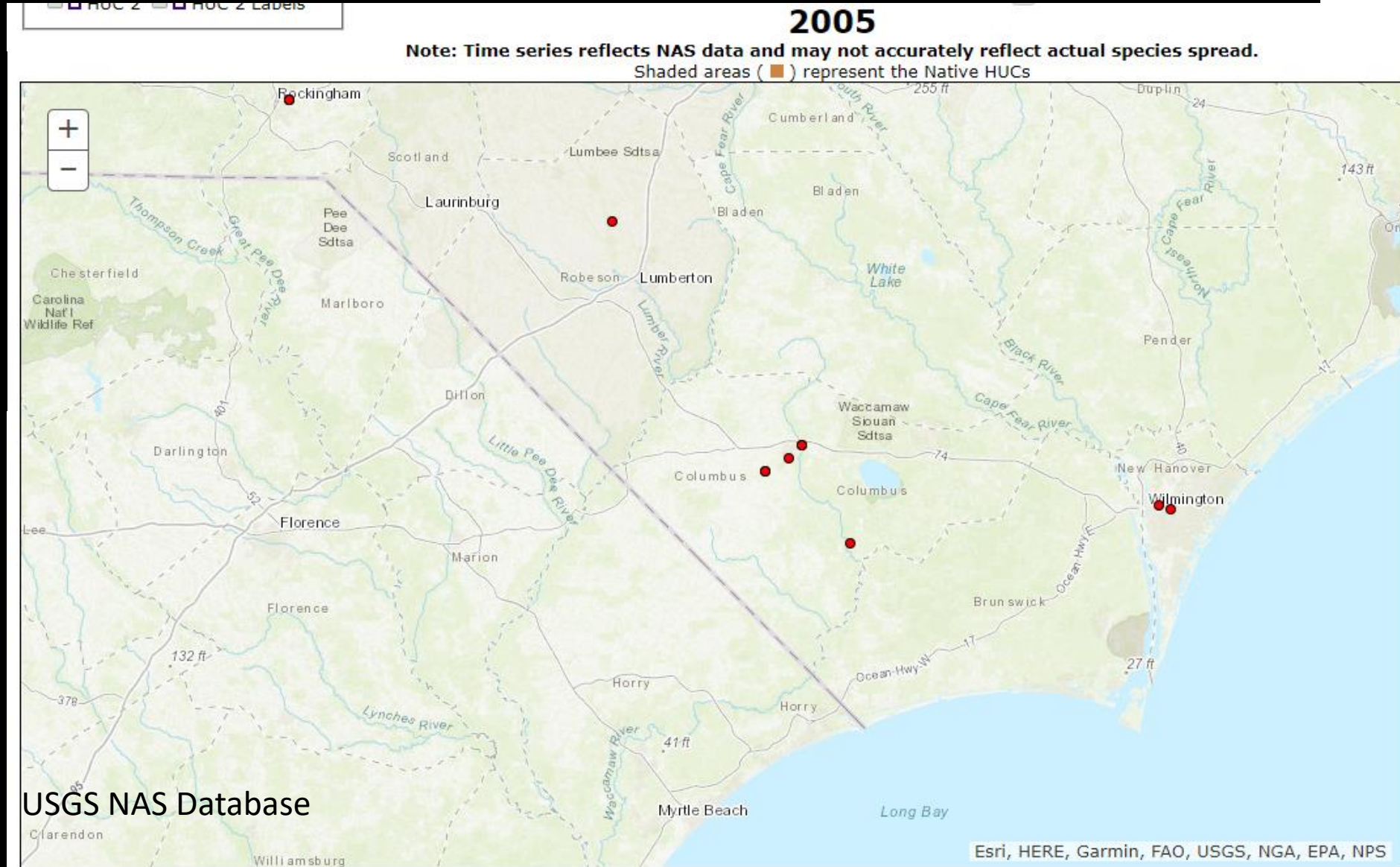
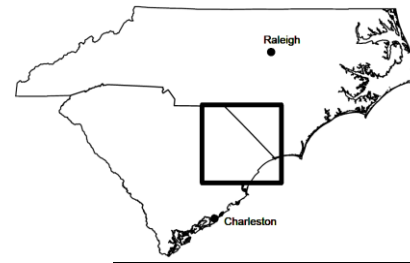
- Becomes quickly established
 - Females retain sperm packets after fertilization by males
 - Only takes 1 fertilized female to establish a population
- Direct and indirect effects on food web structure
- Can shift macrophyte-dominated ecosystems to open-water ecosystems
- Burrowing can be problematic to levees, dykes etc. resulting in water loss and damage to fields



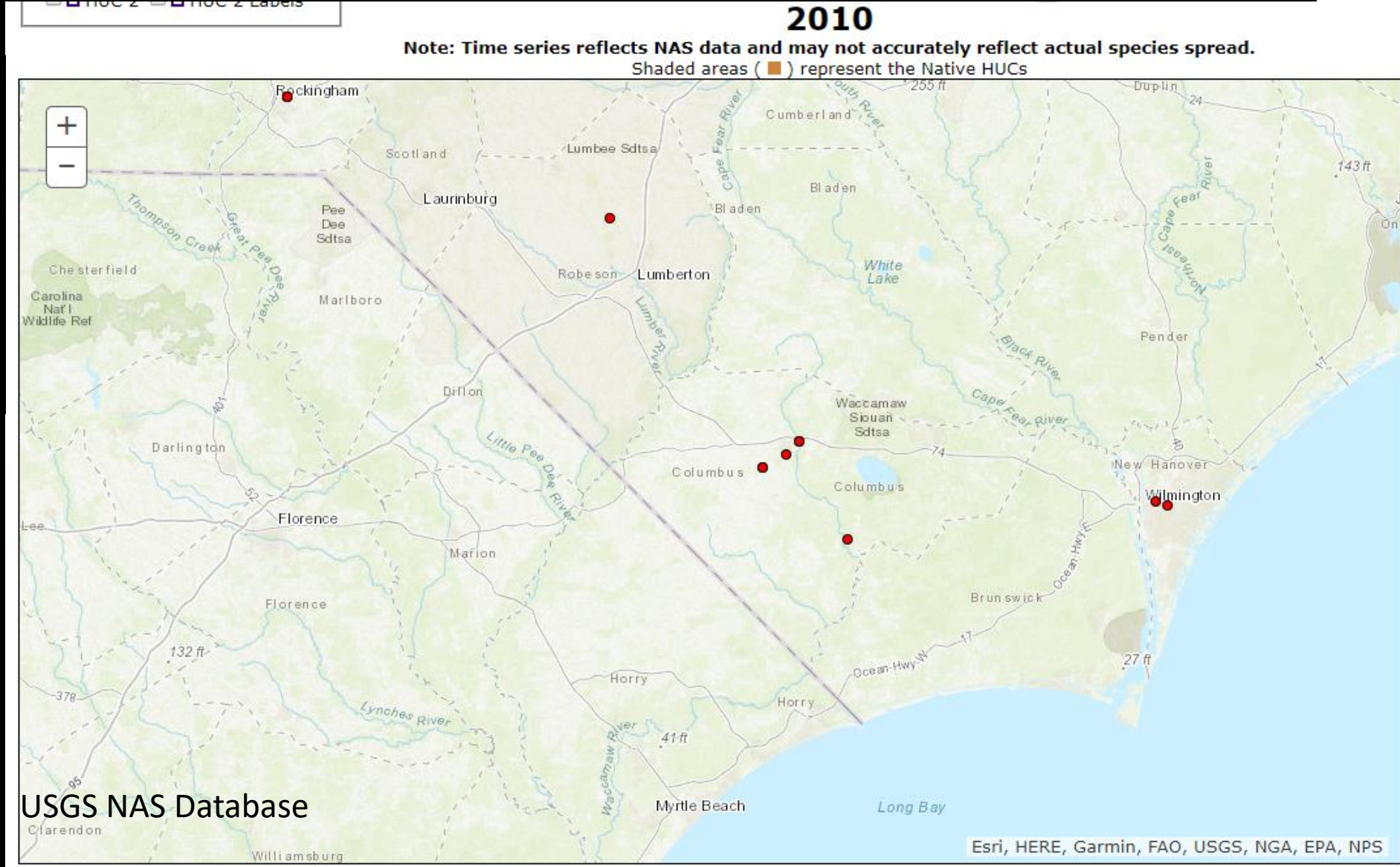
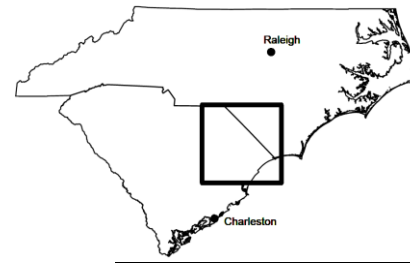
Spread of the red swamp crayfish in NC



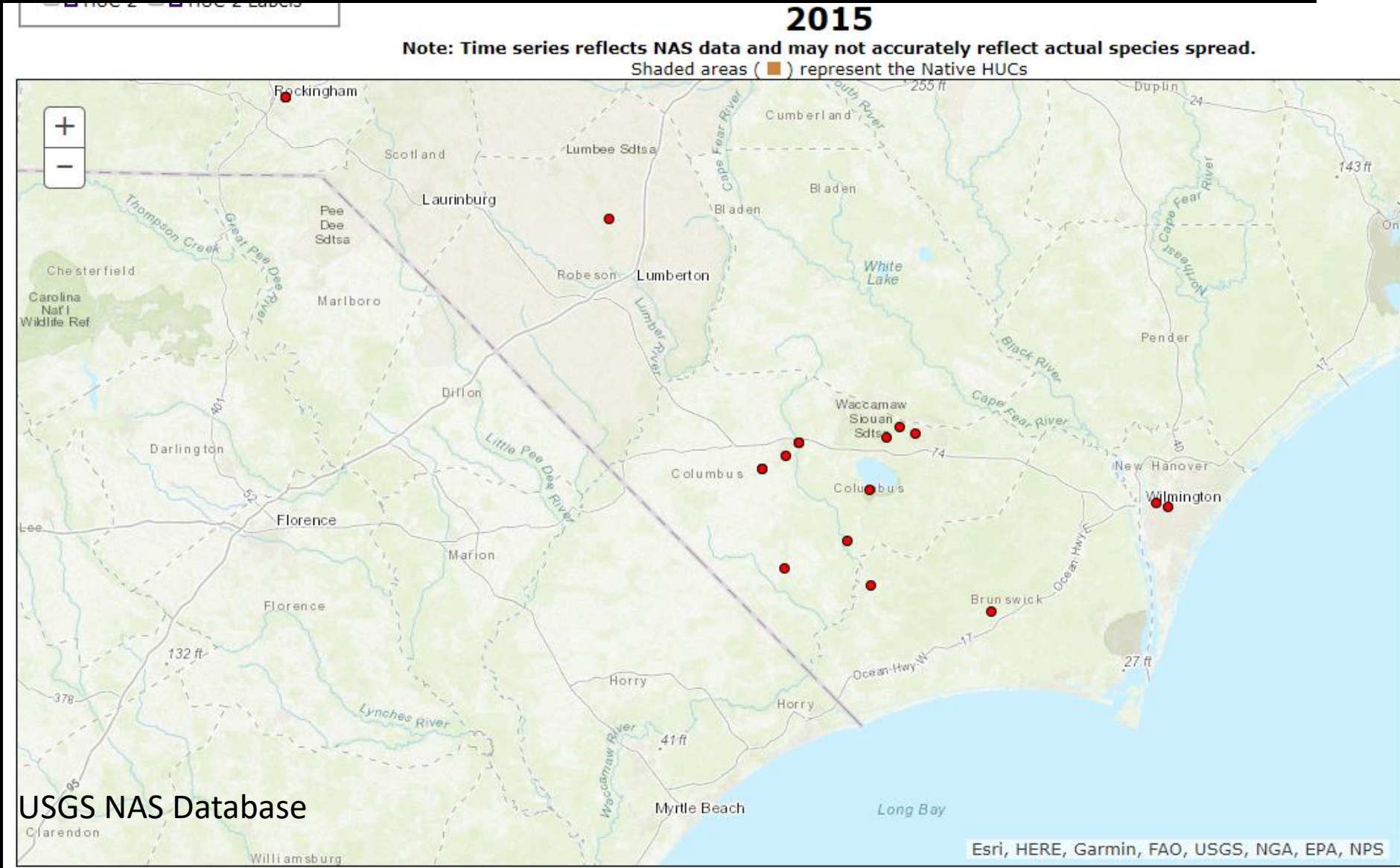
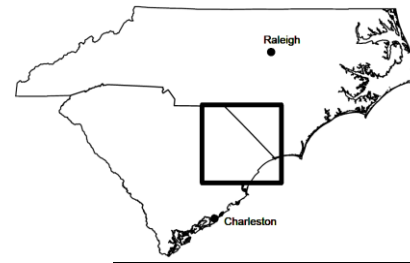
Spread of the red swamp crayfish in NC



Spread of the red swamp crayfish in NC

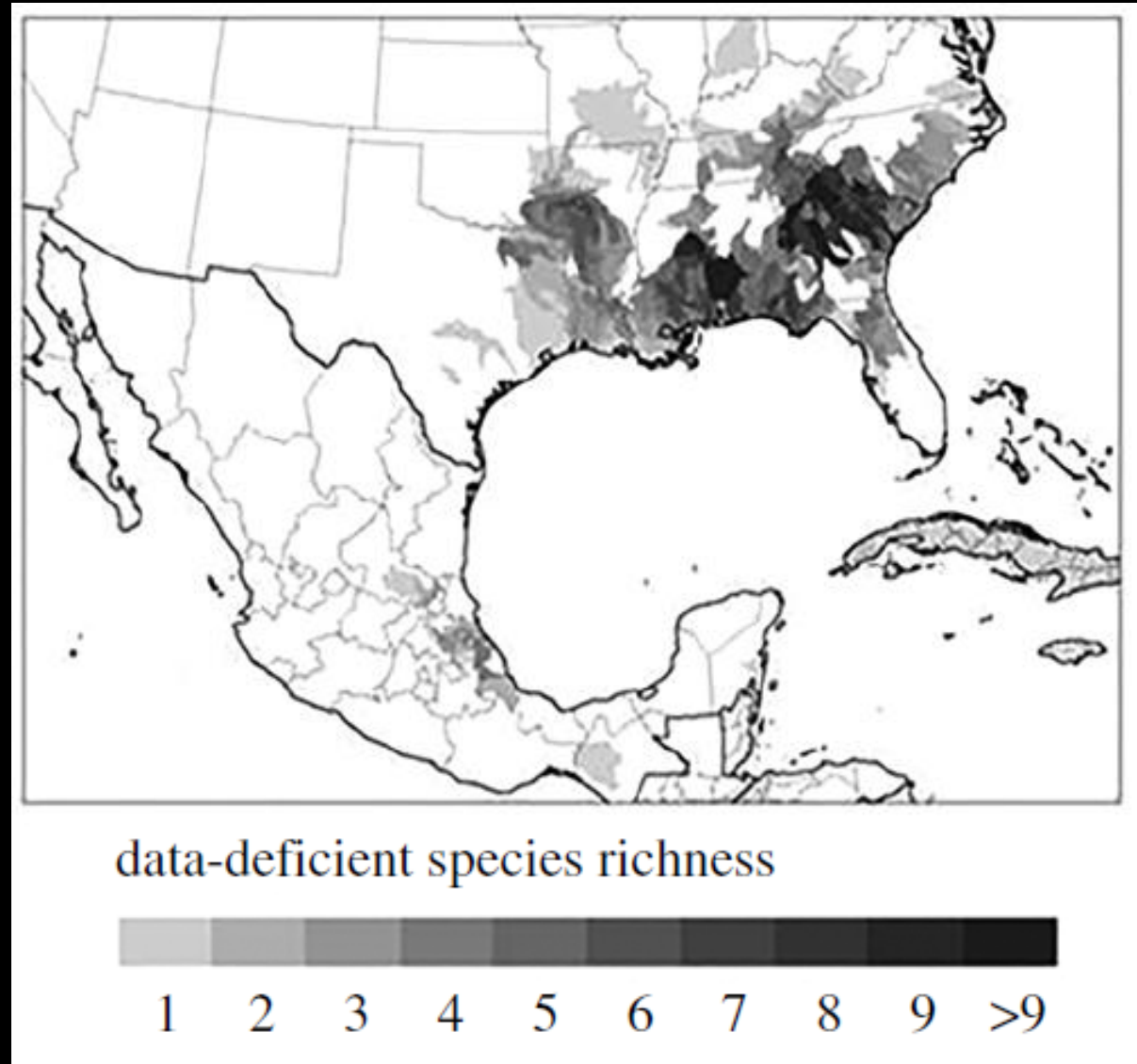


Spread of the red swamp crayfish in NC

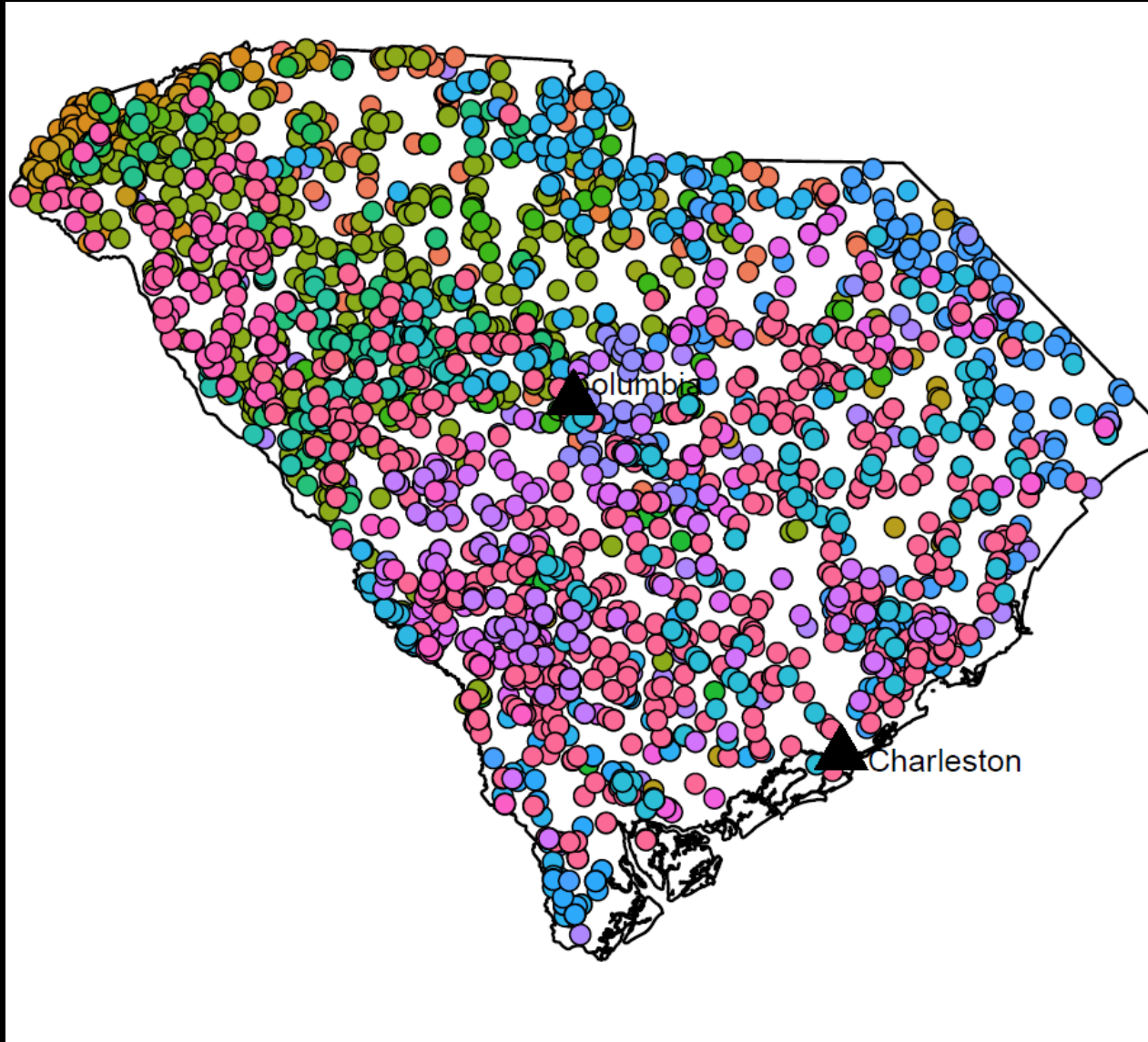




Southeast center of Diversity and data-deficient spp

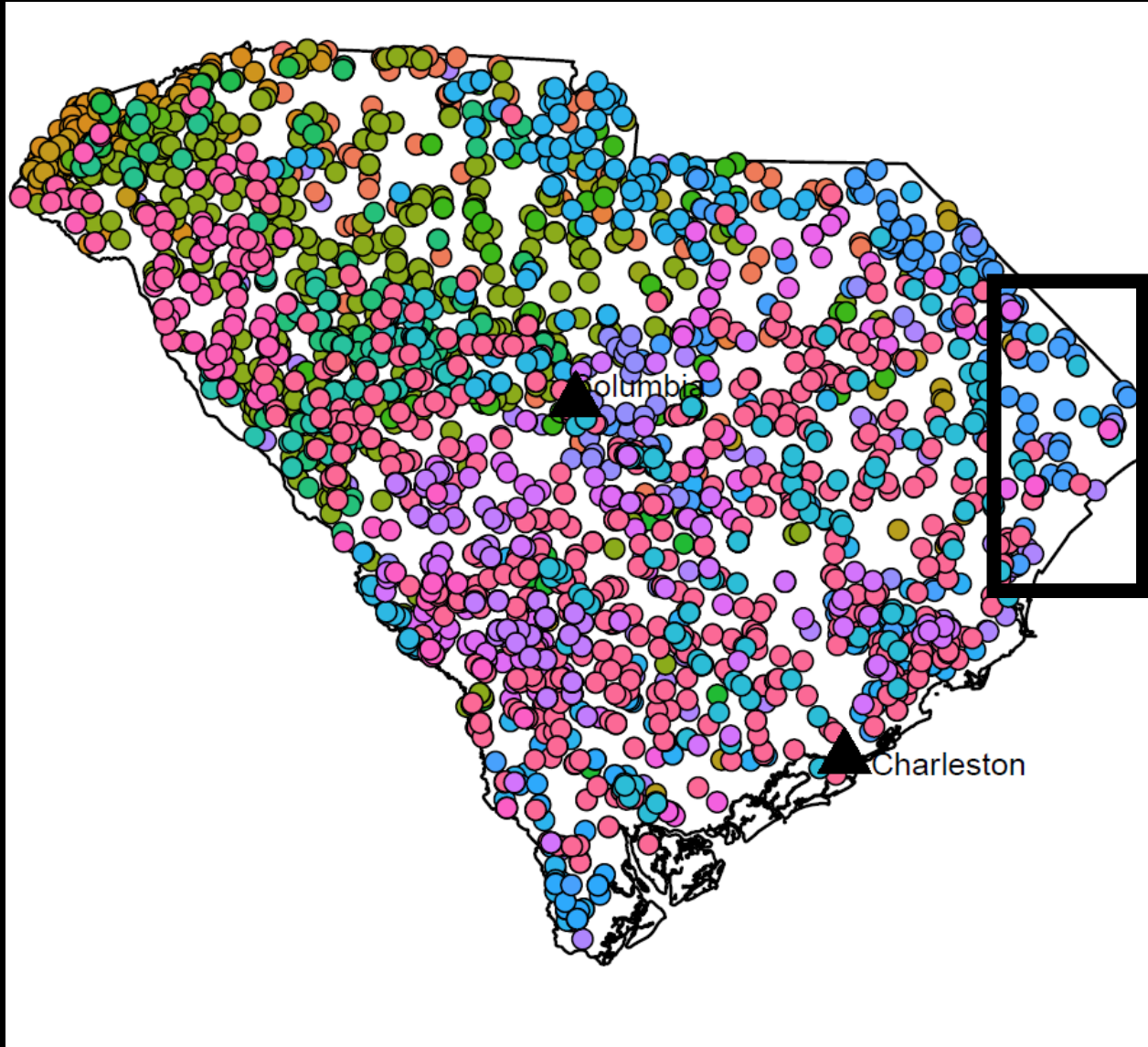


Richman et al. (2015)



60 native crayfish spp. in the Carolinas

- 37 species native to SC
 - 23 conservation priority
- 45 native to NC
 - 19 conservation priority



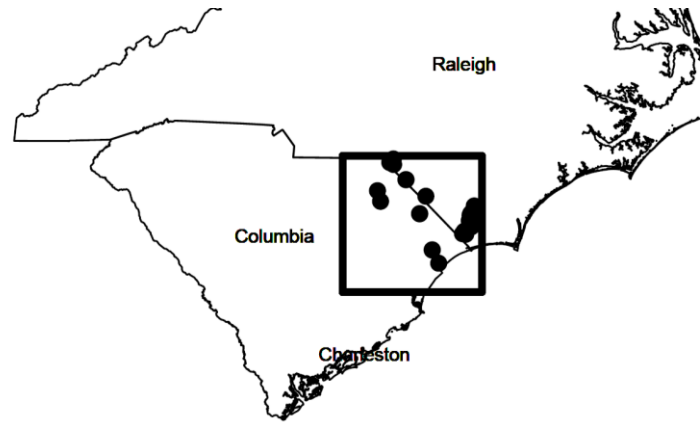
60 native crayfish spp. in the Carolinas

- 37 species native to SC
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 - 19 conservation priority
- Coastal plain portion of Pee Dee watershed under-represented in crayfish records

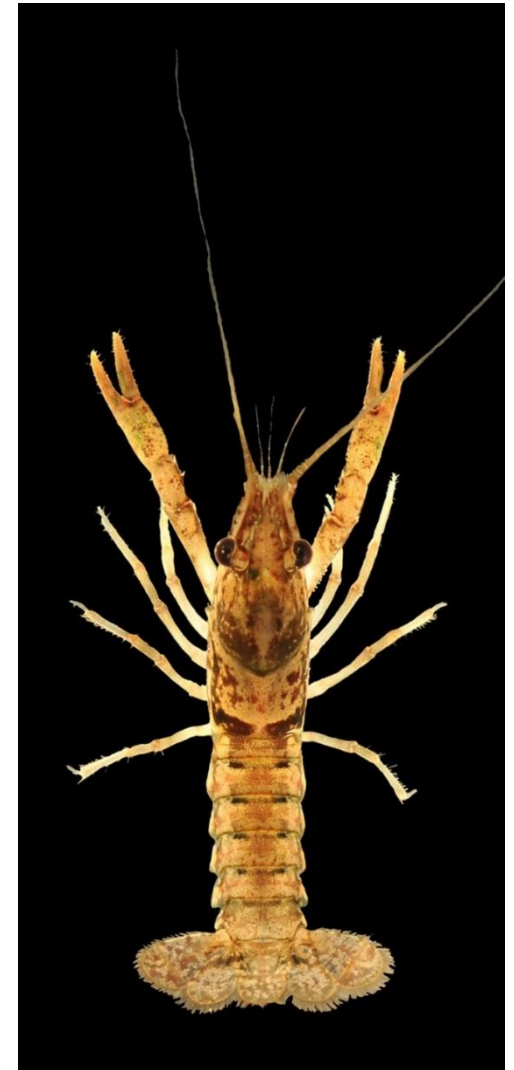
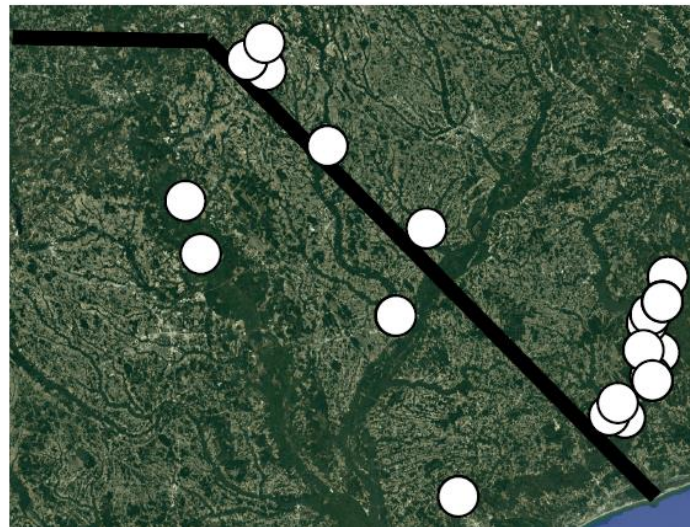
Waccamaw Crayfish

Procambarus braswelli

- Found in Waccamaw, Lumber-Little Pee Dee, and Pee Dee rivers
- Flowing blackwater streams
- Conservation priority in NC & SC
- Received State Wildlife Grant funds to assess current range of the Waccamaw Crayfish

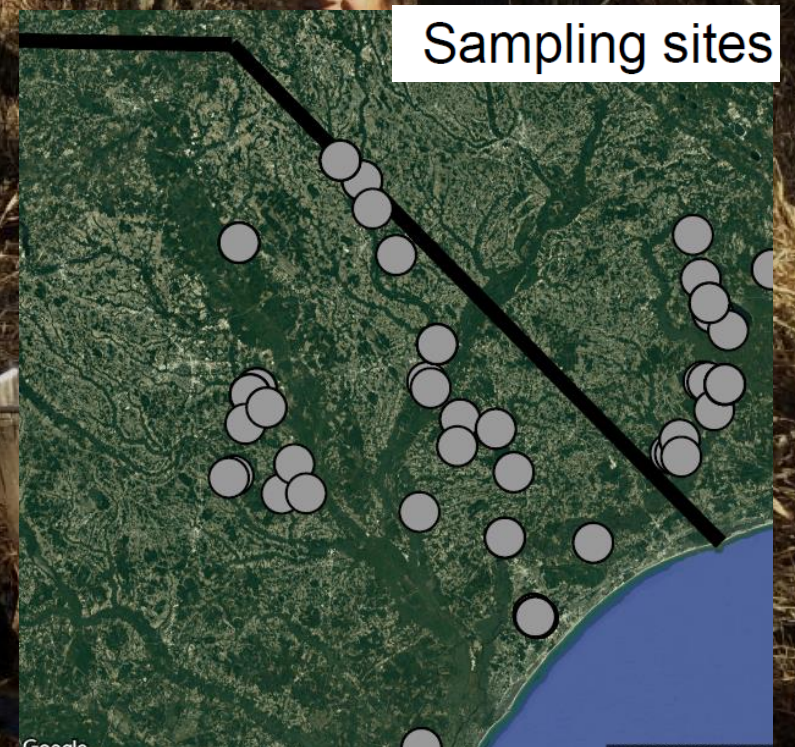
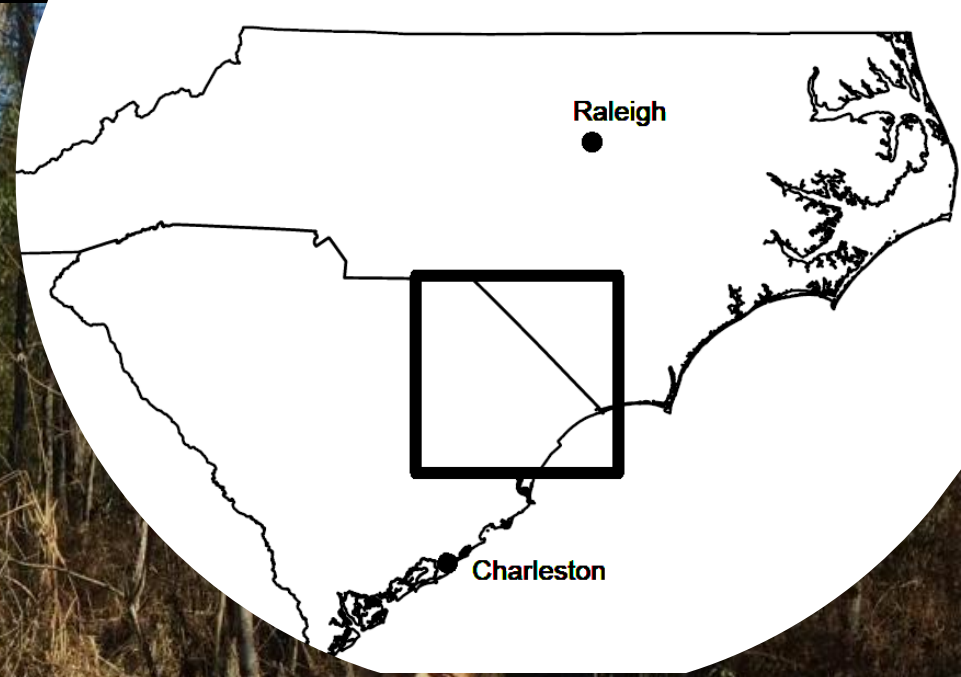


Procambarus braswelli



Searching for the Waccamaw crayfish

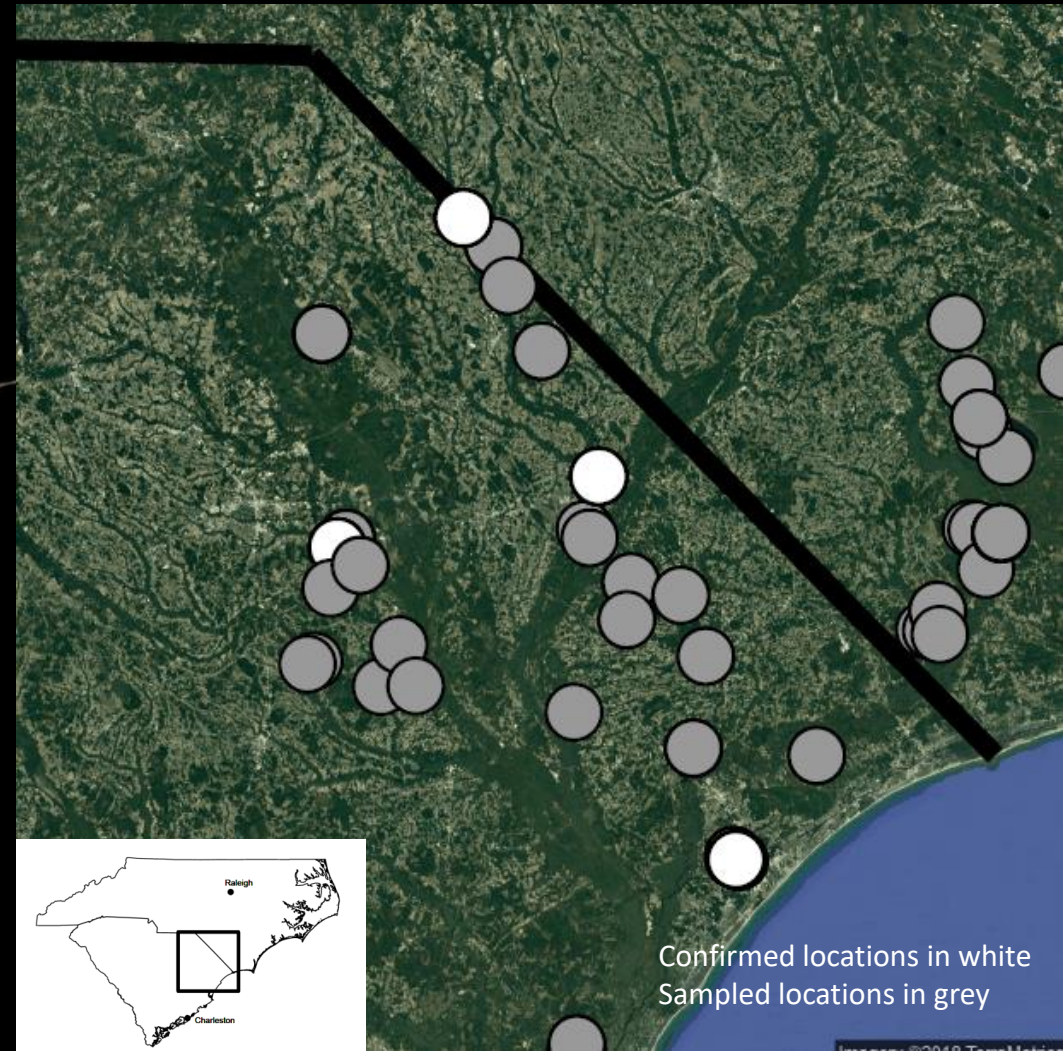
- Sampled 44 locations throughout the Waccamaw, Lumber, Pee Dee, and Lynches watersheds
- Used dip-nets, seines, and minnow traps to collect crayfish from rivers, streams, swamps and wetlands through this region
- Retained all specimens for identification



Previously-documented locations for the Waccamaw Crayfish



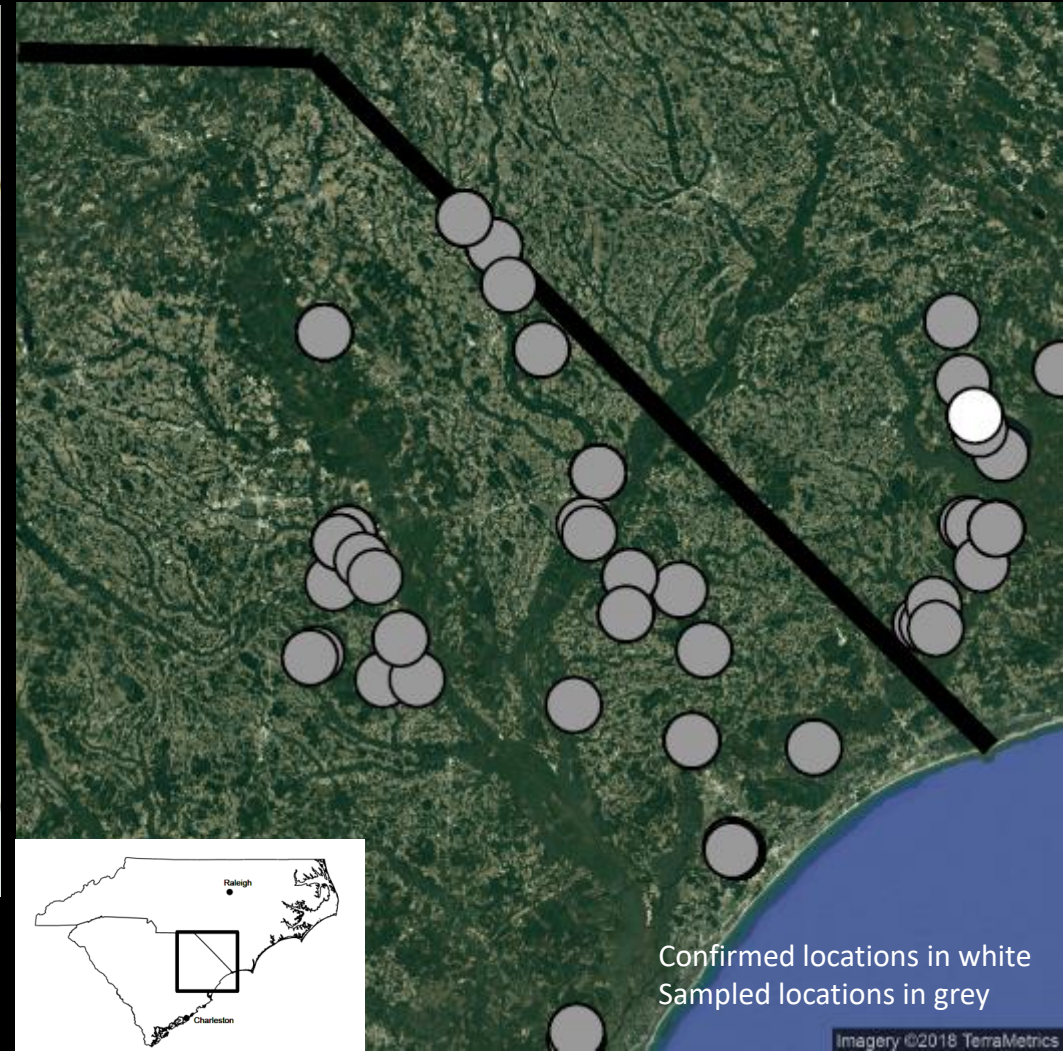
Confirmed locations for the Waccamaw Crayfish



Sandhills Crayfish *Procambarus pearsei*



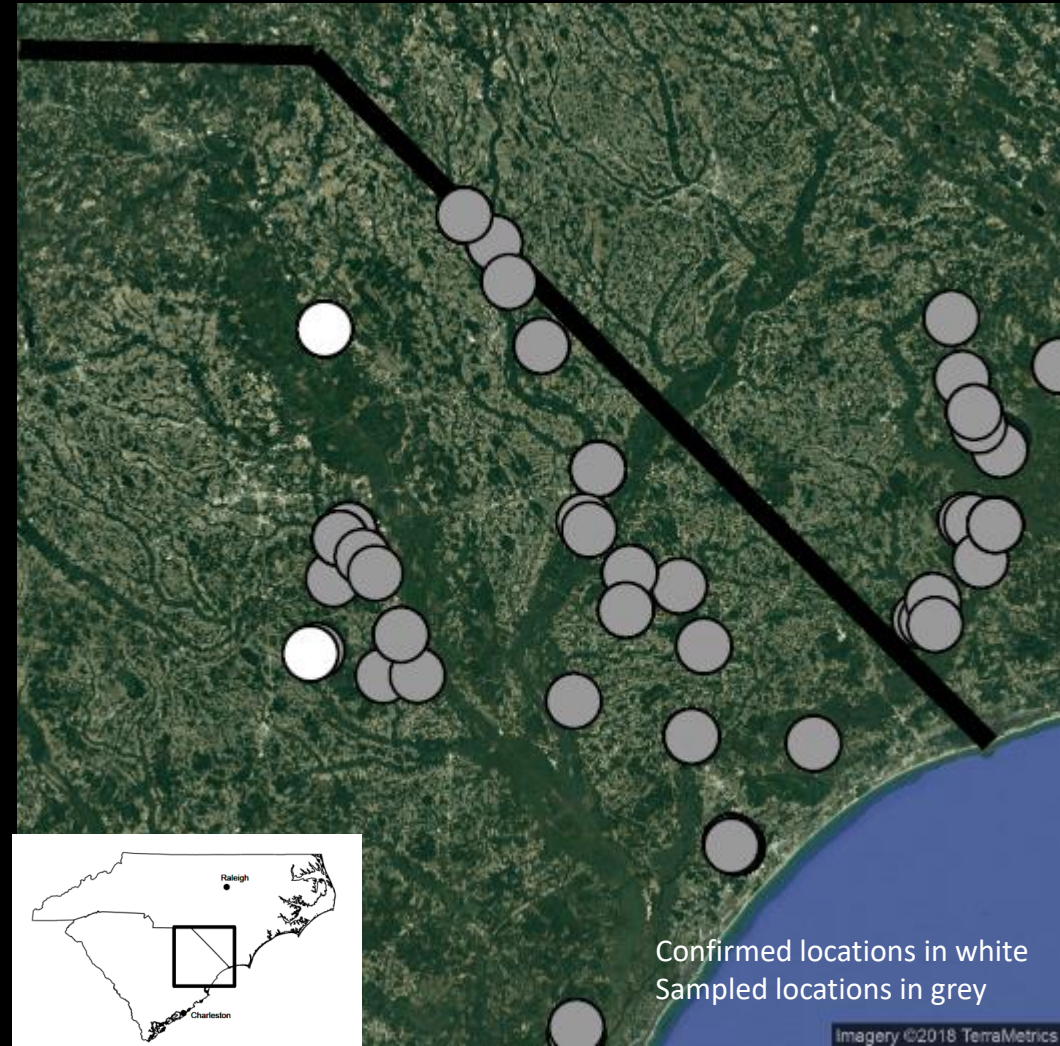
<https://www.ncwildlife.org/Learning/Species/Crustaceans/Procambarus-O-pearsei>



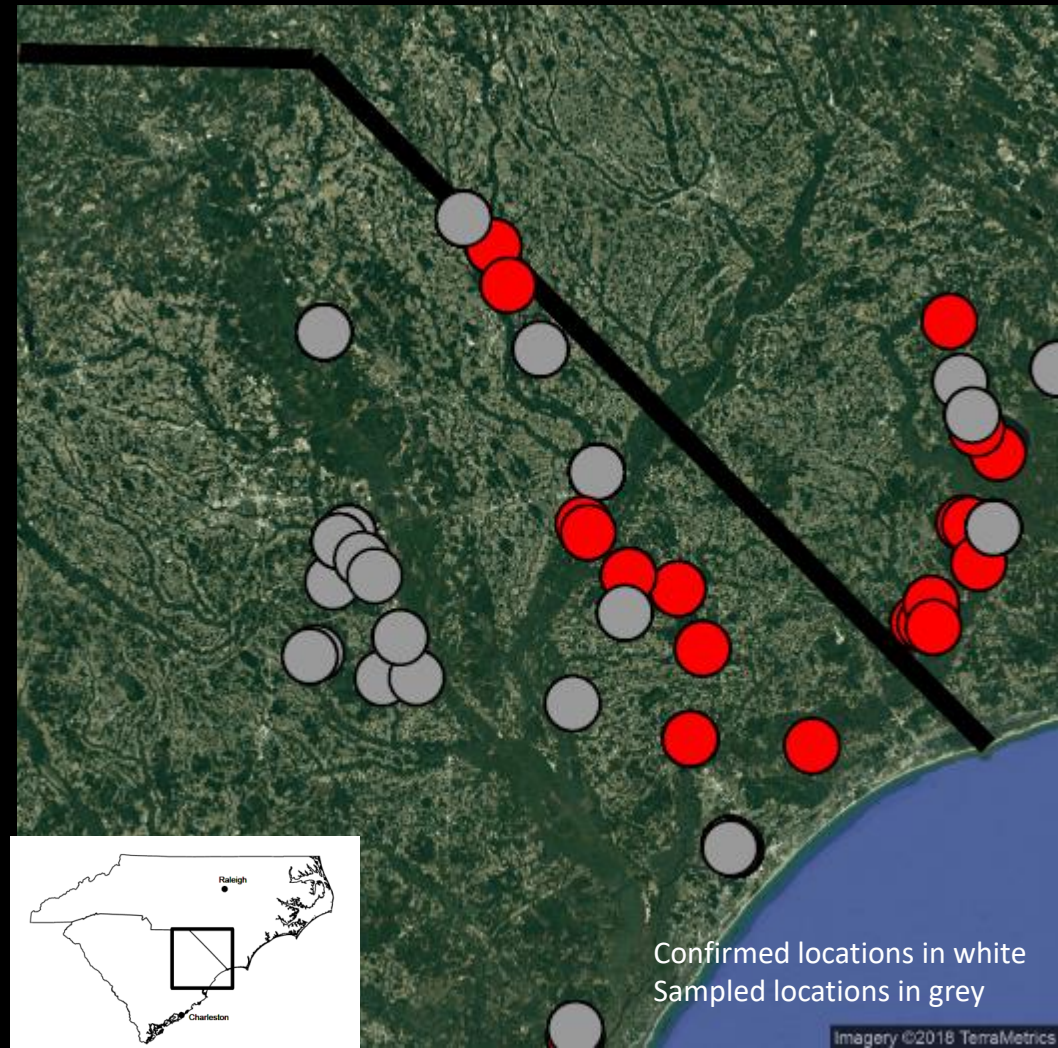
Coastal Plain Crayfish *Procambarus ancylus*



<https://www.ncwildlife.org/Learning/Species/Crustaceans/Procambarus-O-ancylus>



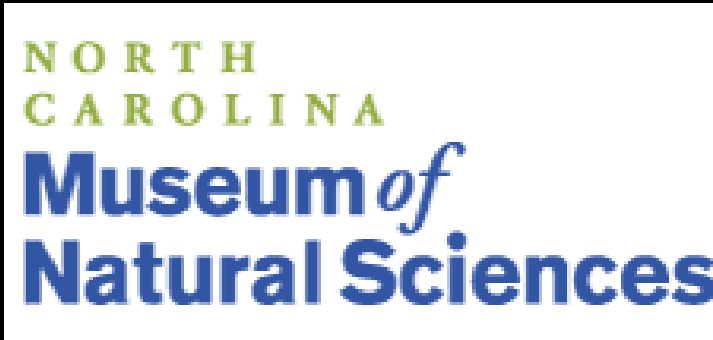
New records for the red swamp crayfish



Next steps for understanding red swamp crayfish in the Carolinas

- Three-year USFWS State Wildlife Grant funding
- Continue documenting location and abundance information for native and non-native crayfish in the Pee Dee drainage
- Improve our understanding of introduction and dispersal events leading to recent expansion of *P. clarkii*
 - Compare genetic structure of *P. clarkii* populations within sub-watersheds of the Pee Dee
 - Help distinguish human-mediated from natural dispersal in crayfish





Acknowledgements

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 - SC-State Wildlife Grant



Questions