Investigating Dispersal Pathways of the Invasive Red Swamp Crayfish

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Invasive species spread globally (and locally)

- Non-native species that harm natural resources
- Cost $26.8 billion per year
  - Losses of goods/services/production
  - Costs of management
- Understanding their ecology is important for developing effective management strategies

Red Swamp Crayfish *(Procambarus clarkii)*: A global invader

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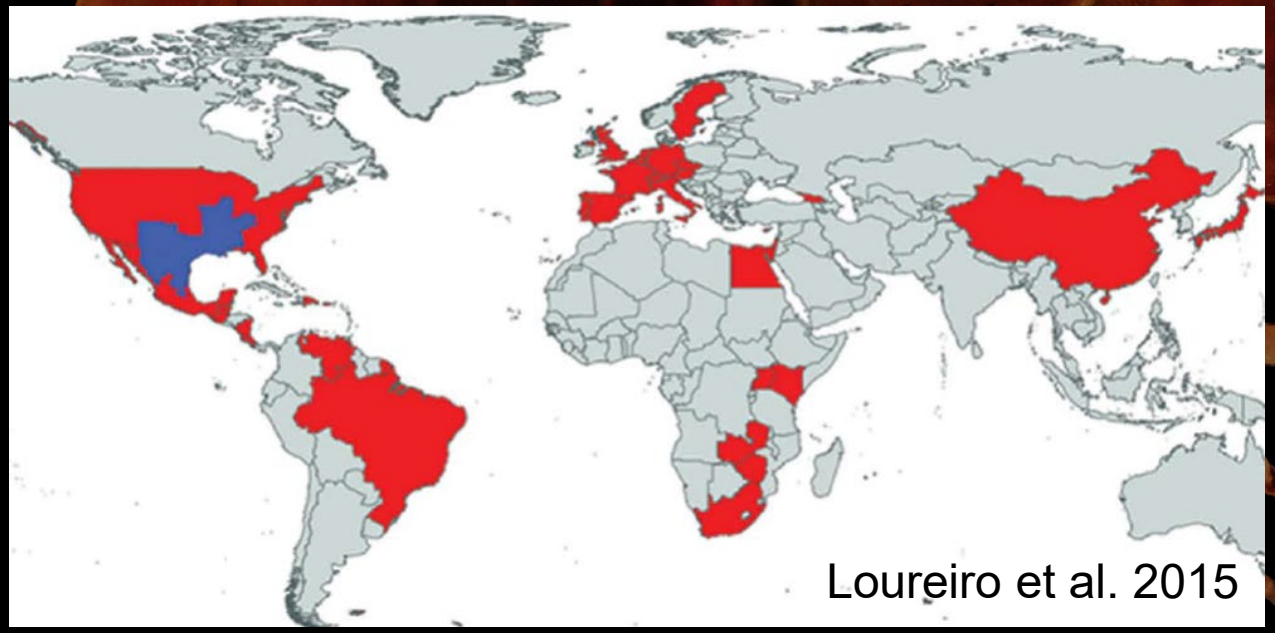
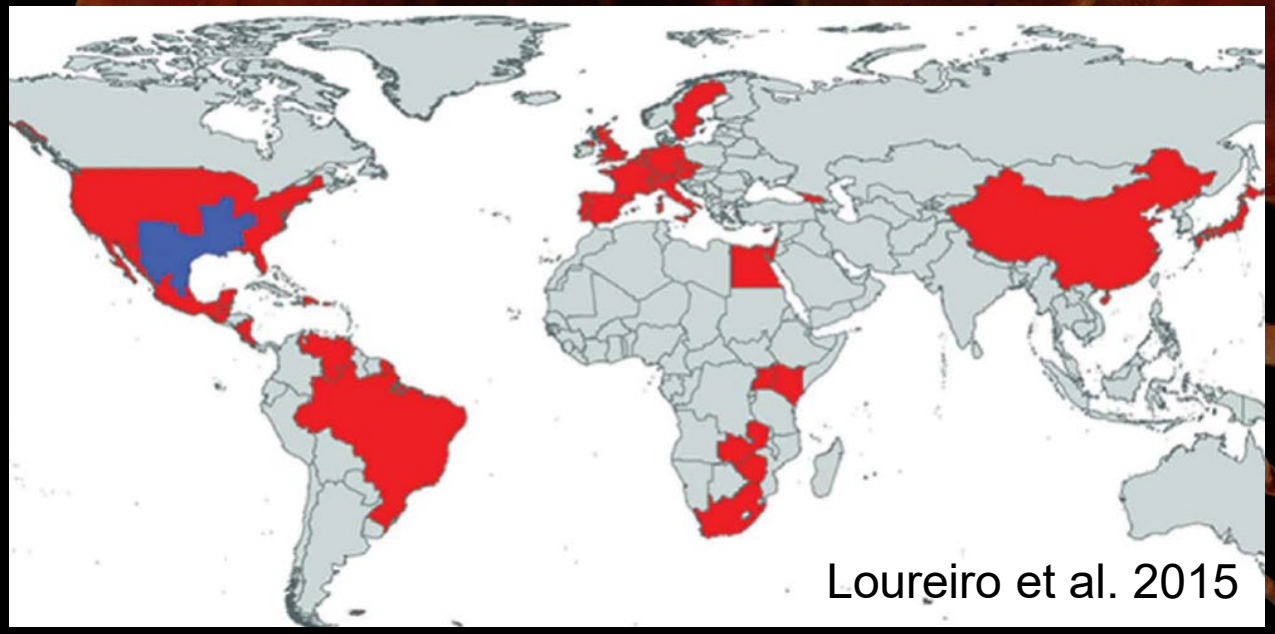


Loureiro et al. 2015

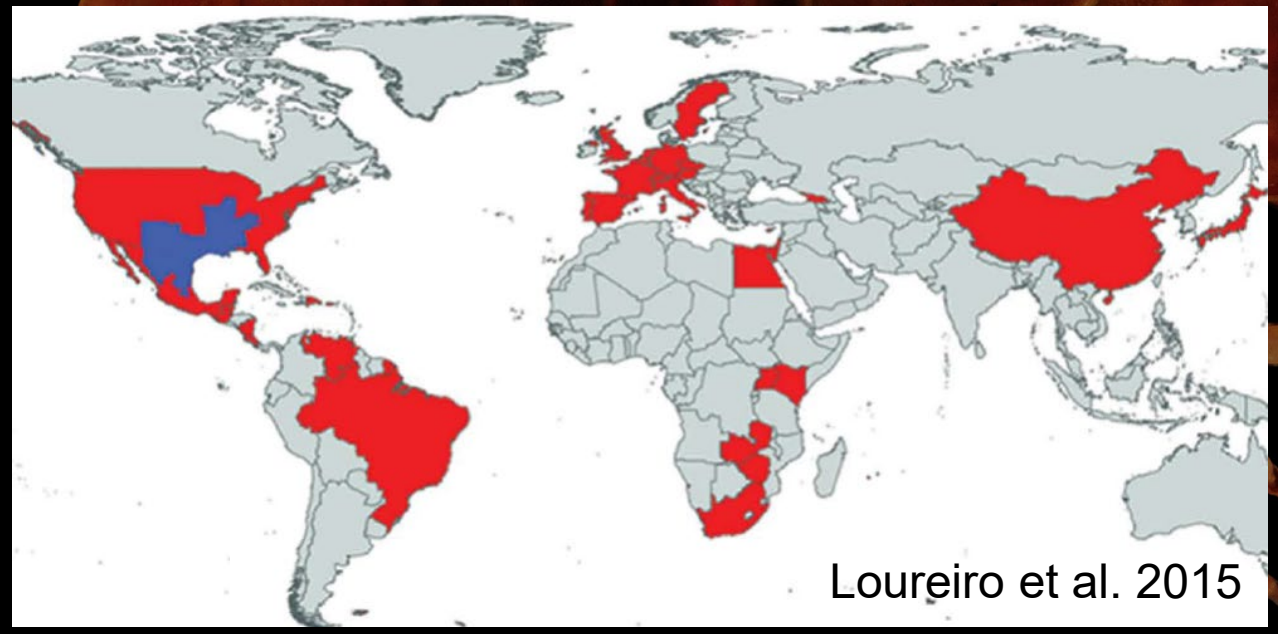
Red Swamp Crayfish *(Procambarus clarkii)*: A global invader



Movement

- Aquaculture, bait, aquarium trade
- Natural dispersal (in-water and overland)

Red Swamp Crayfish *(Procambarus clarkii)*: A global invader



Movement

- Aquaculture, bait, aquarium trade
- Natural dispersal (in-water and overland)

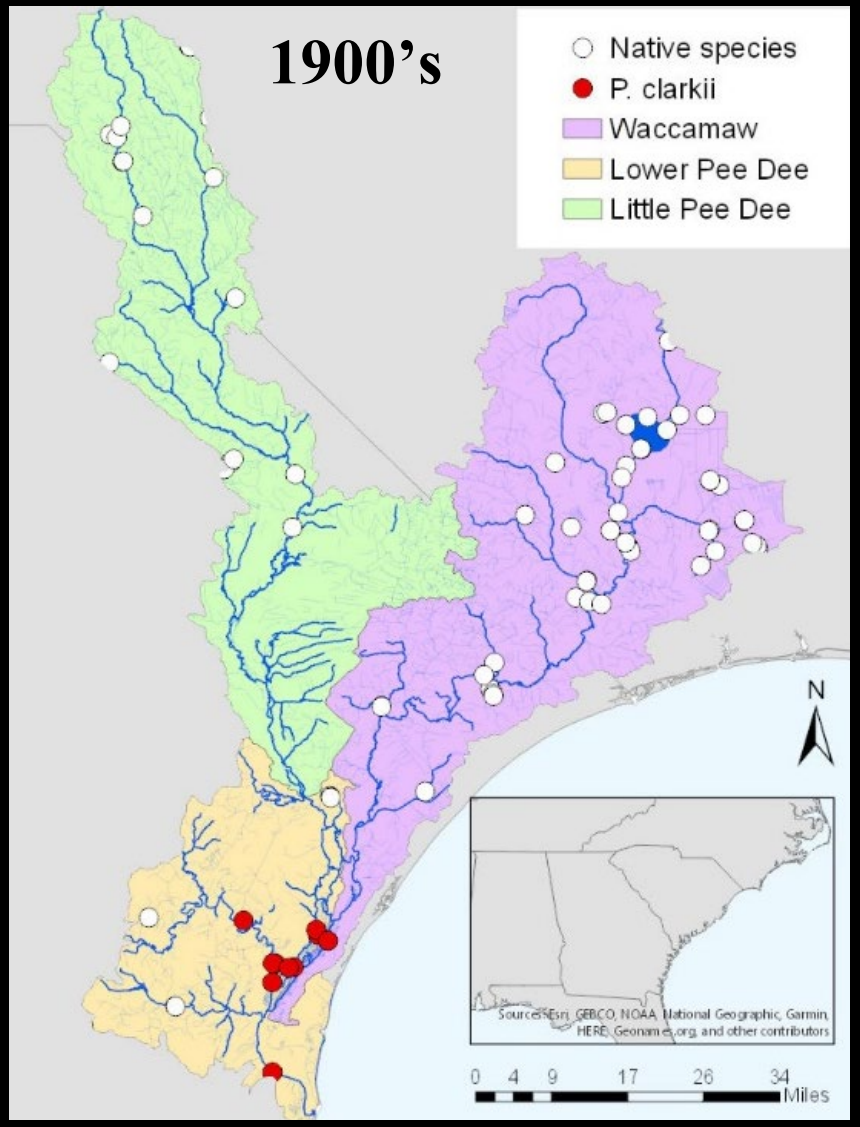
Impacts

- Displaces native species
- Reduces macrophyte density
- Vector for parasites and disease

Objectives

1. Document the spread
2. Infer dispersal patterns
3. Assess impacts on native crayfishes

Compile historical crayfish data



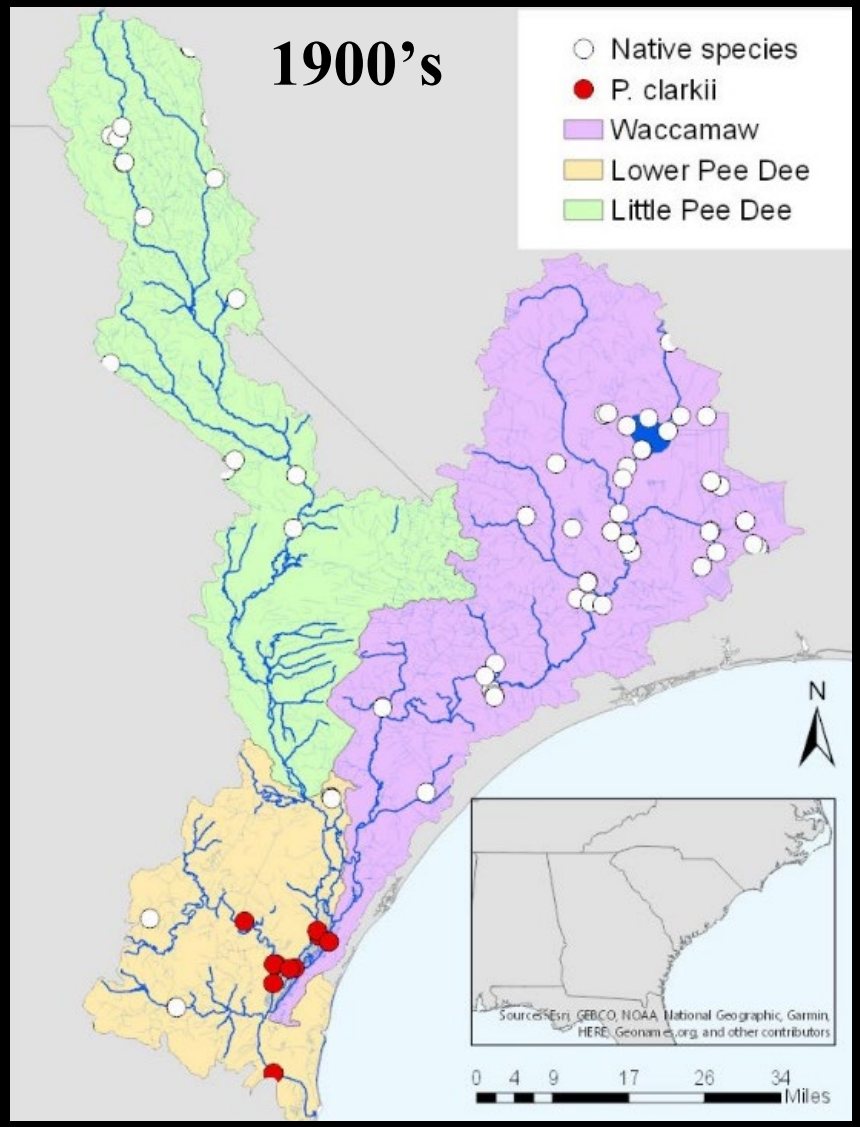
Collect new data!

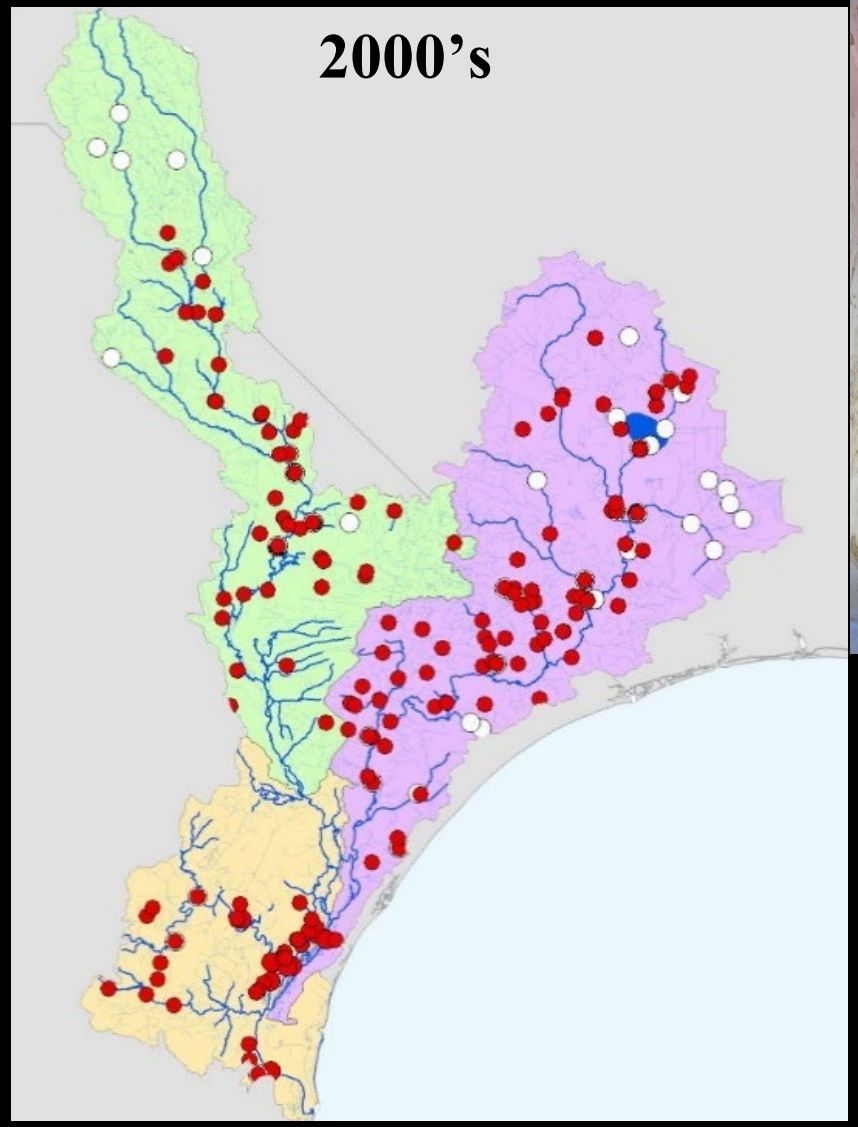
Creeks, Rivers, and Streams

Roadside Ditches

Swamps

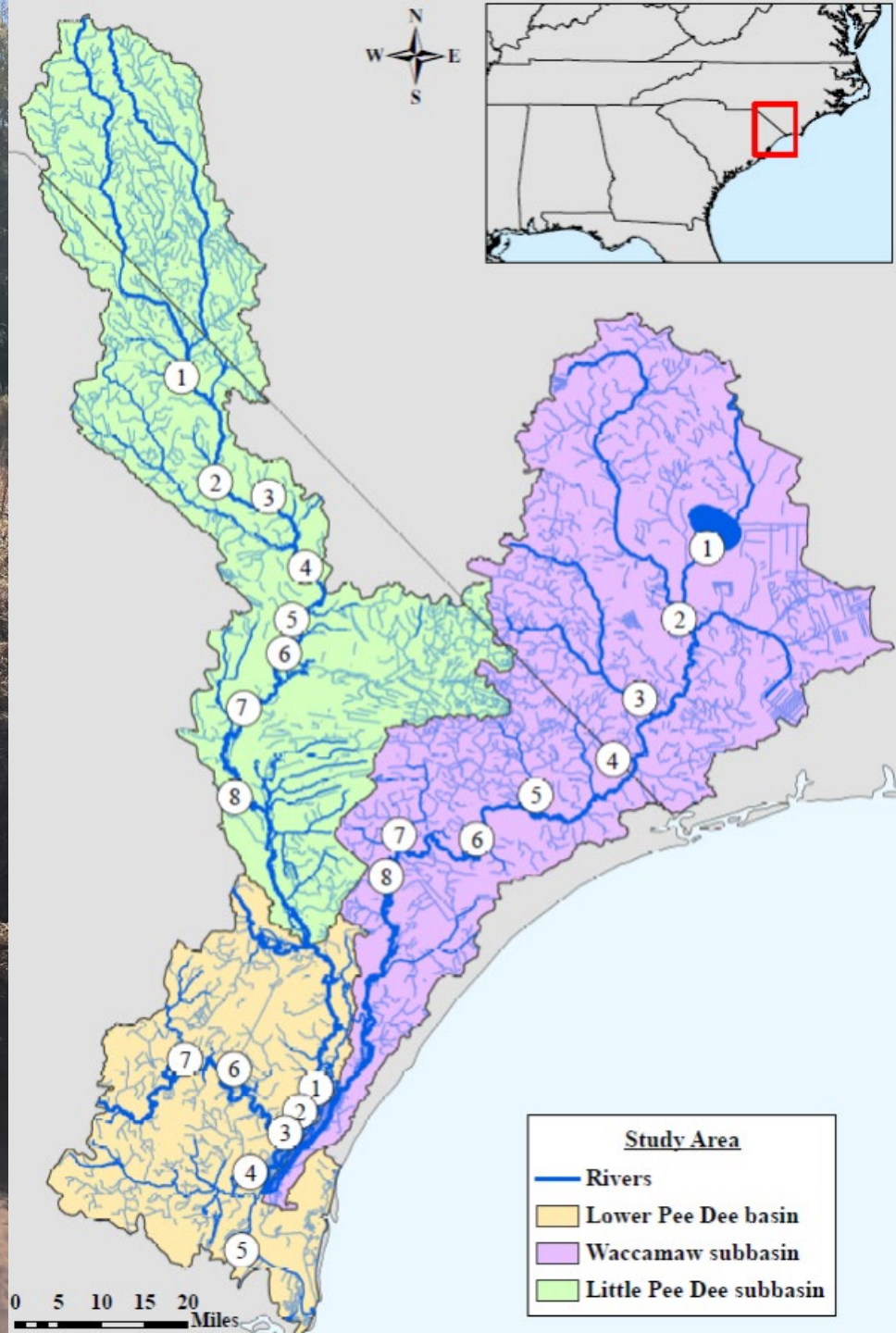
Document the spread

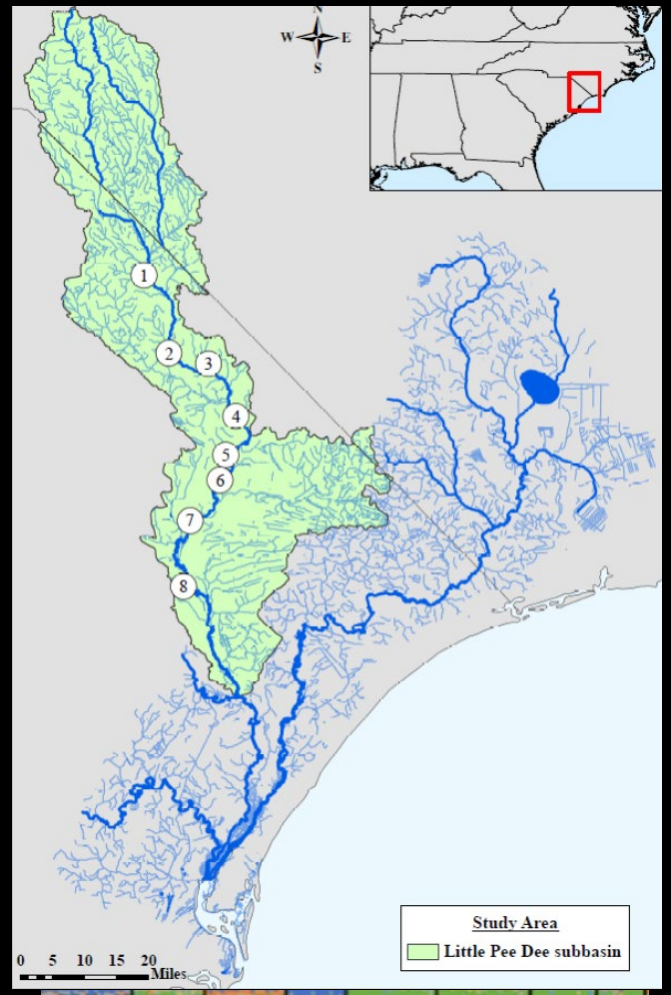




Inferring dispersal

- Molecular tool development
  - Genomic sequencing
- Is genetic structure related to watershed characteristic?

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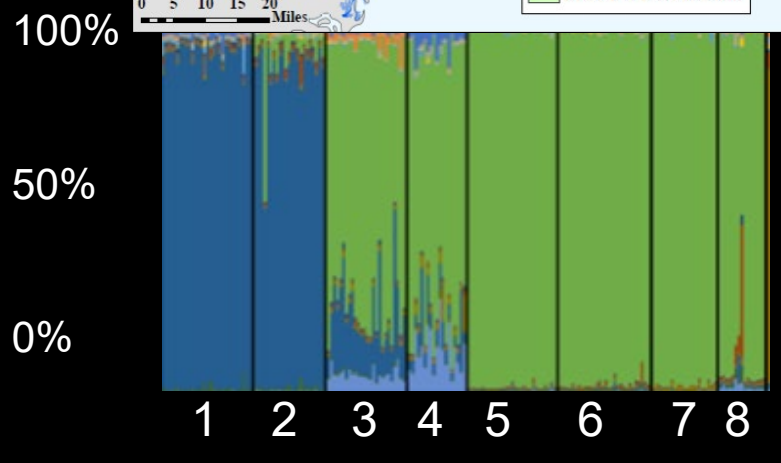
Miles
Study Area
Little Pee Dee subbasin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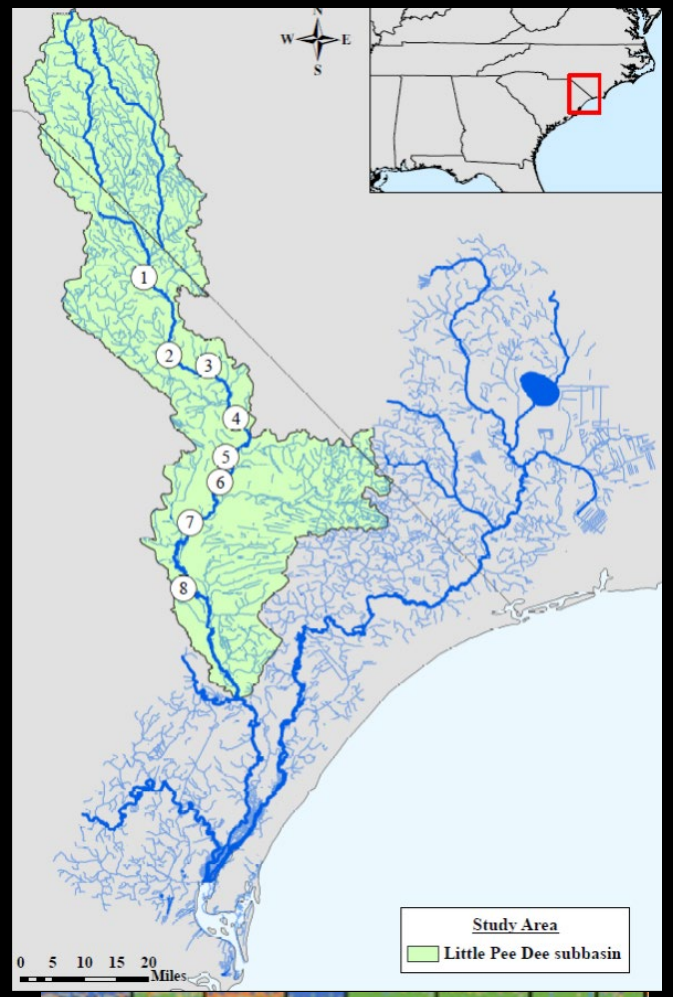
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Study Area
Little Pee Dee subbasin
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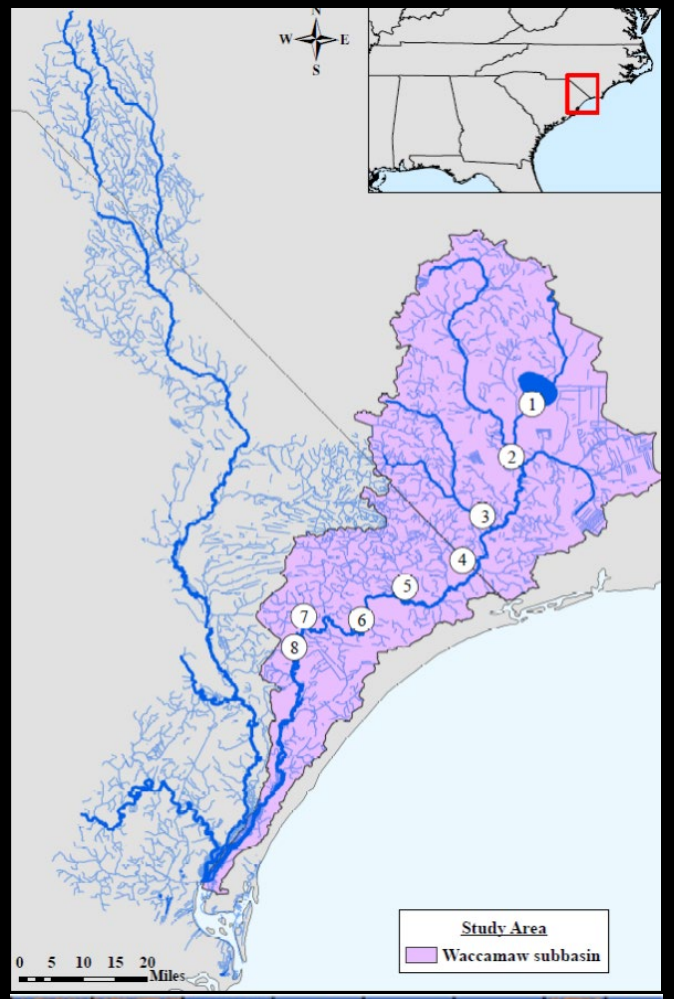
Miles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Study Area
Waccamaw subbasin
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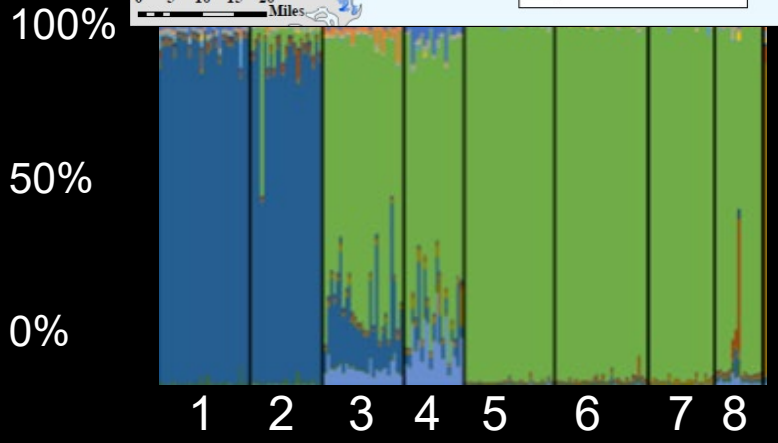
Miles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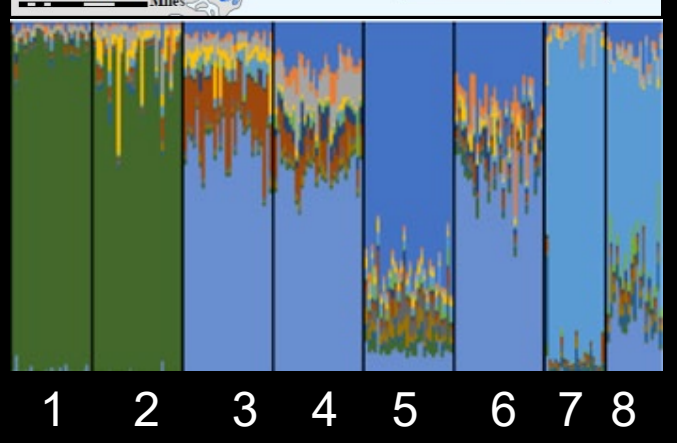
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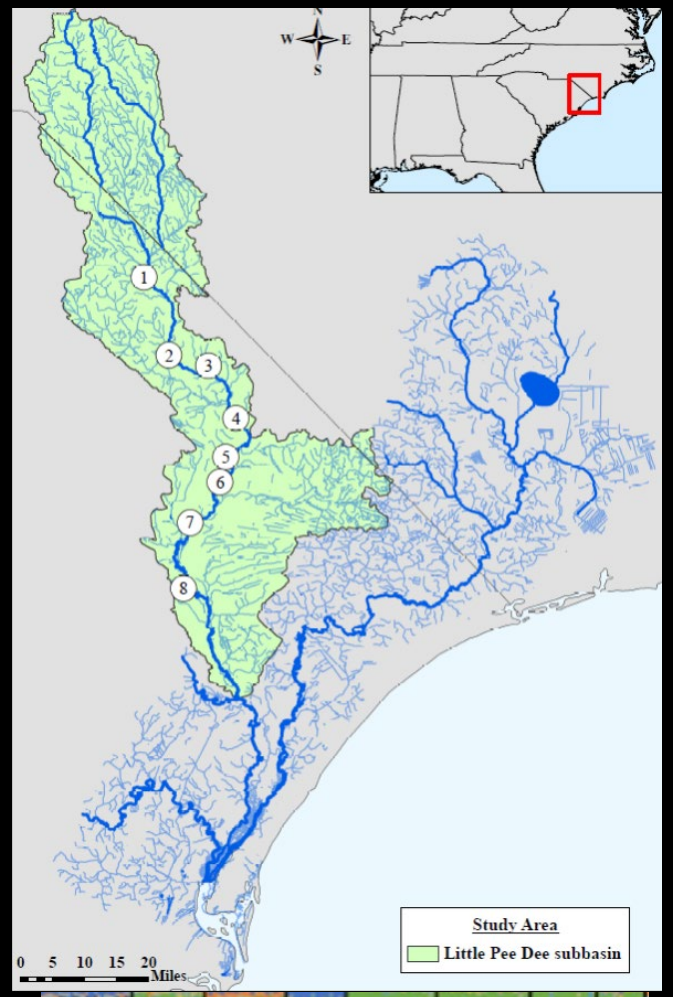
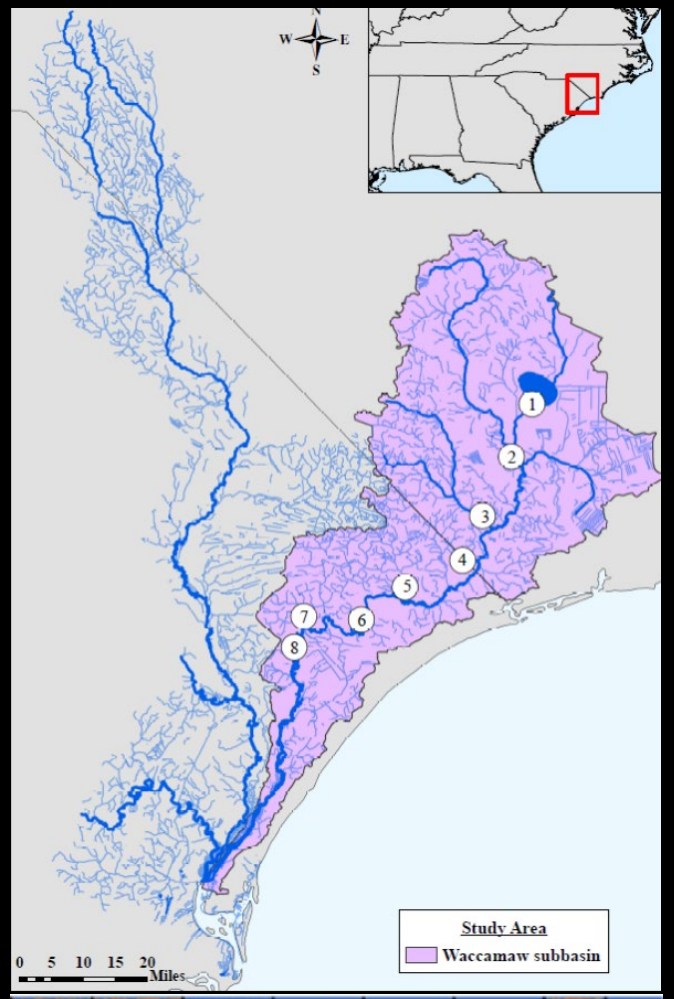
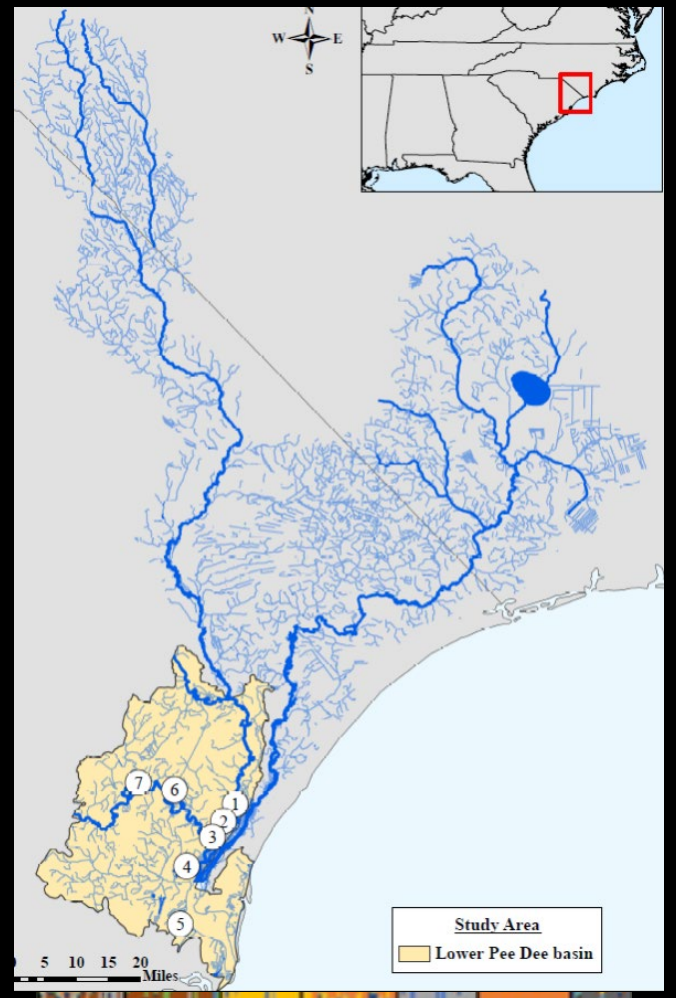
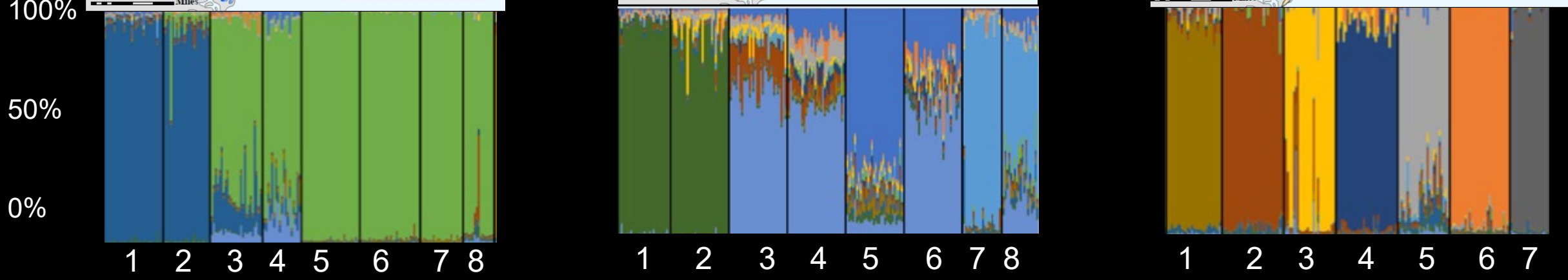

Study Area
Little Pee Dee subbasin
0 5 10 15 20
Miles


Study Area
Waccamaw subbasin
0 5 10 15 20
Miles


Study Area
Lower Pee Dee basin
5 10 15 20
Miles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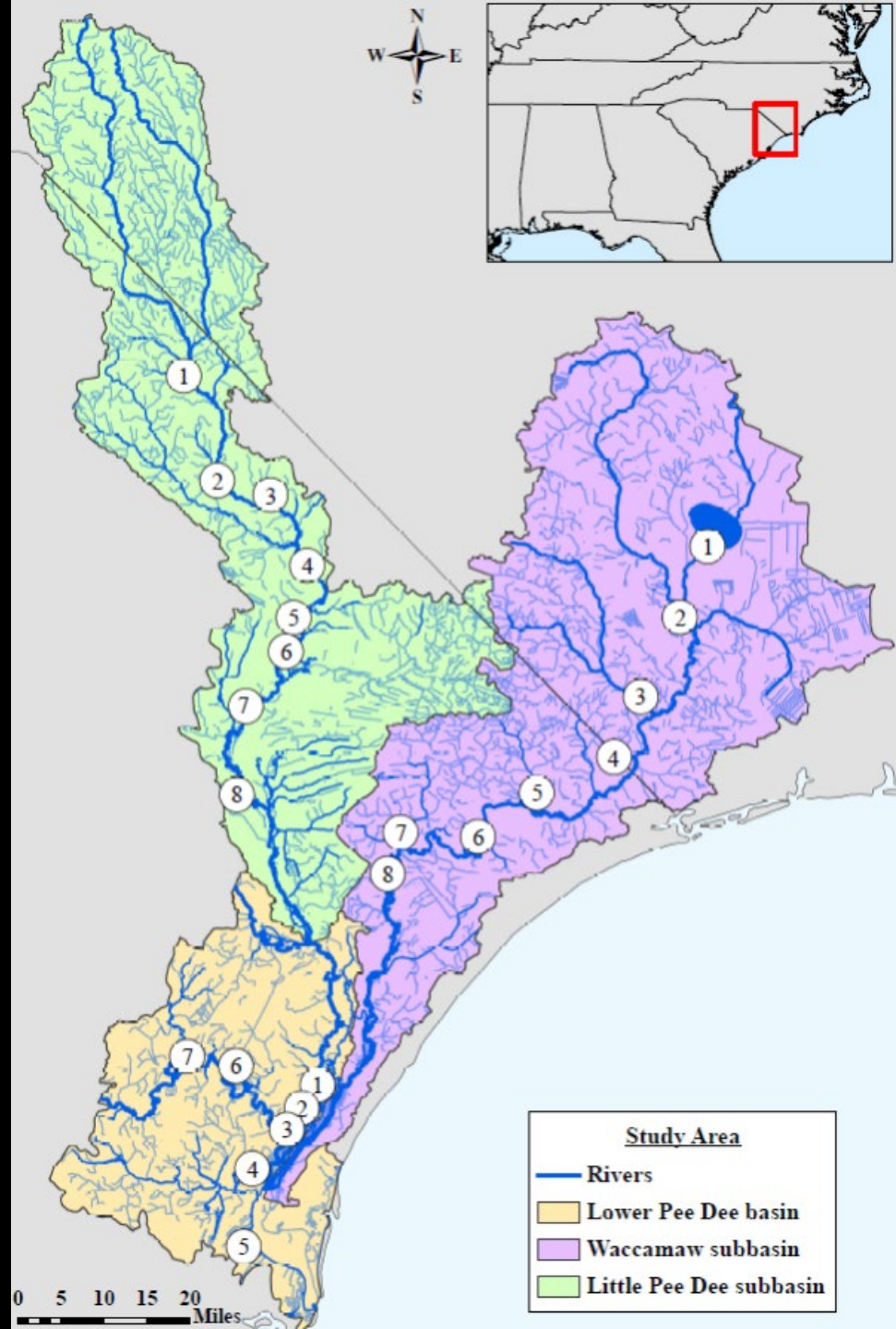
Dispersal mechanisms

- Natural dispersal
  - Waccamaw and Little Pee Dee
  - Potential longitudinal pattern of gene flow
  - Few introduction points
- Anthropogenic dispersal
  - Variability unrelated to watersheds
  - Dispersal associated with aquaculture?



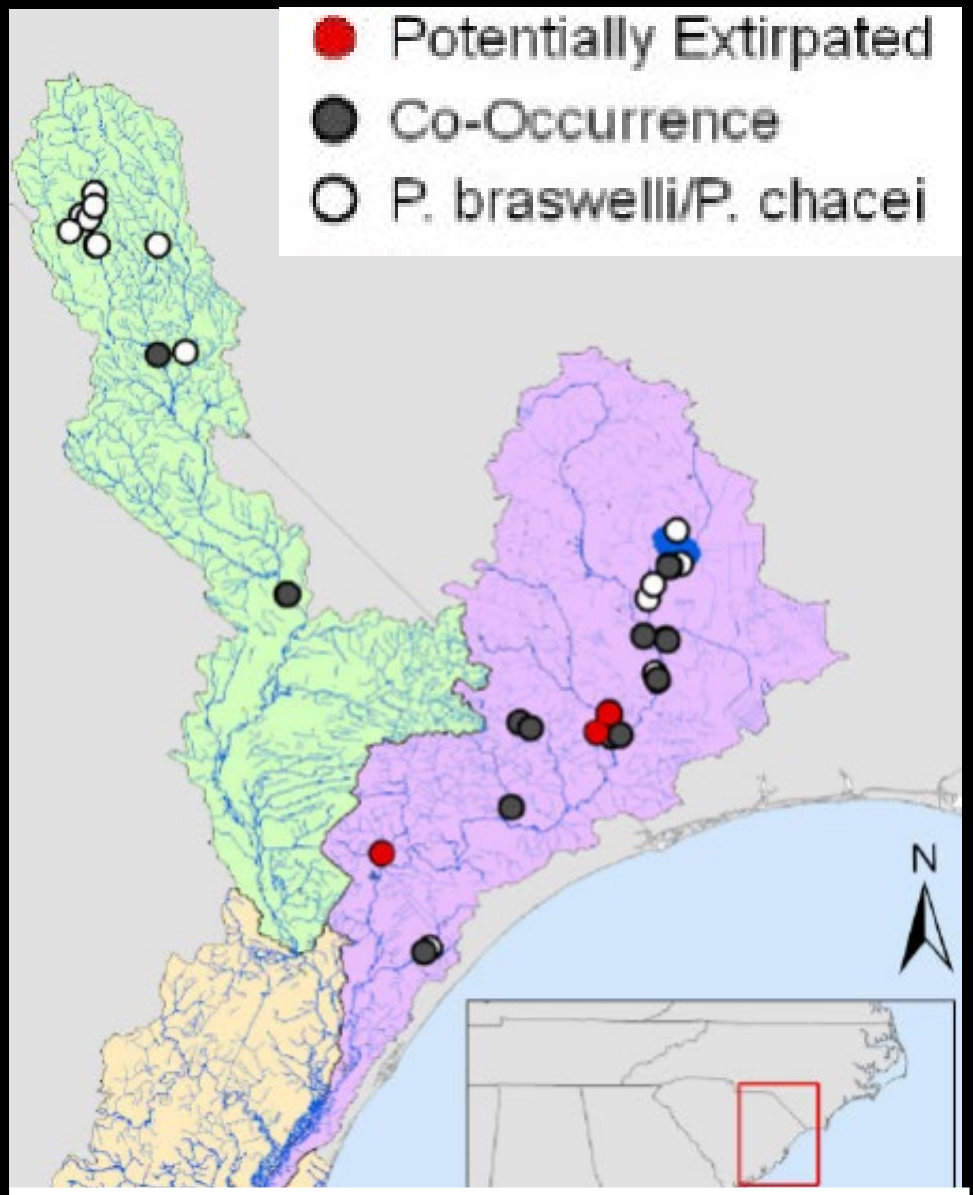
Help reduce the spread of invasive species

- Minimize moving animals
- Prevent escape artists

Acknowledgements

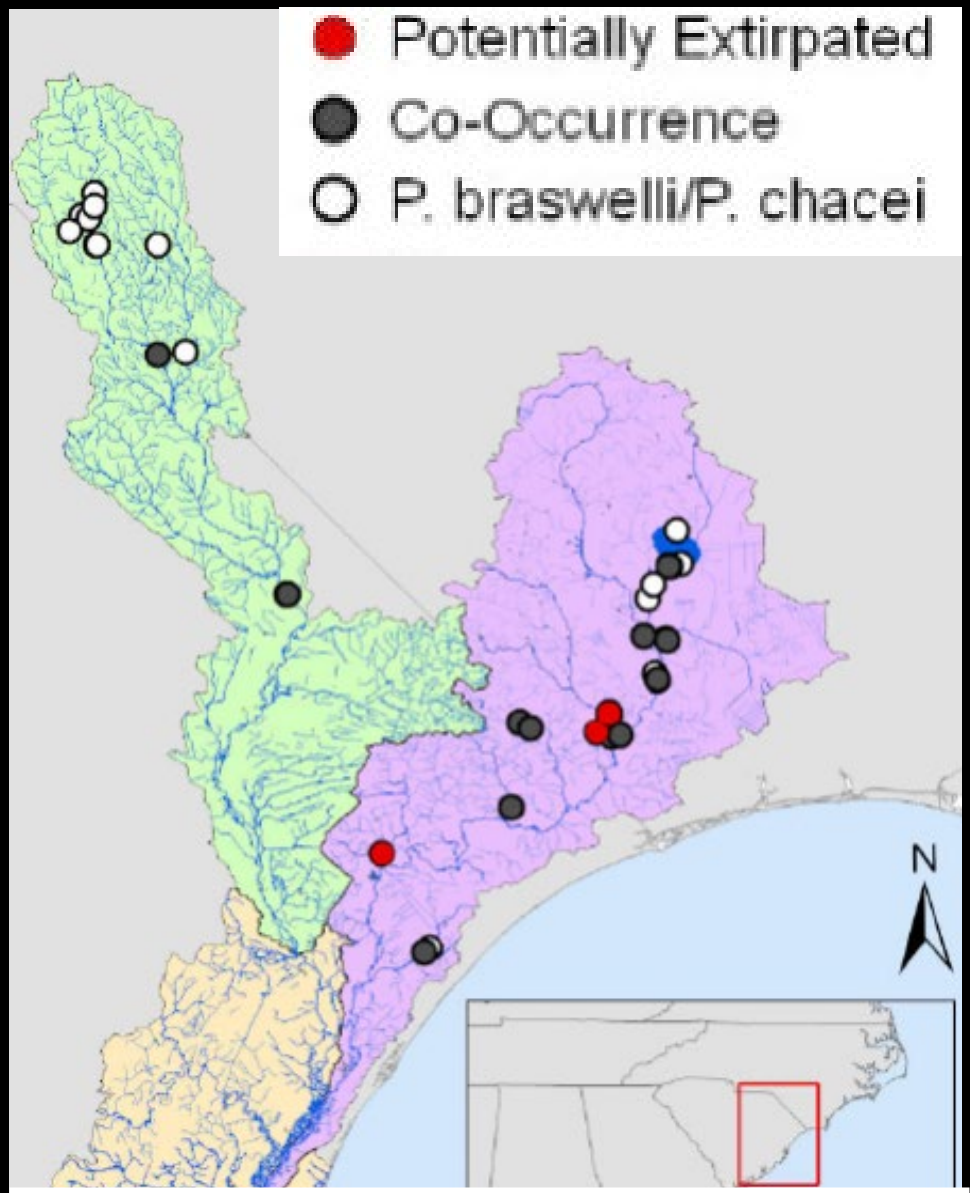
- SCDNR's Crustacean Research and Monitoring Section
- Daniel Farrae
- Ellen Reiber
- Arnie Eversole
- Jack Whetstone
- Landowners (especially Jim Hill)
- Funding
  - USFWS (SC-T-F18AF00962)

Impacts on native species



P. braswelli/chacei

Impacts on native species



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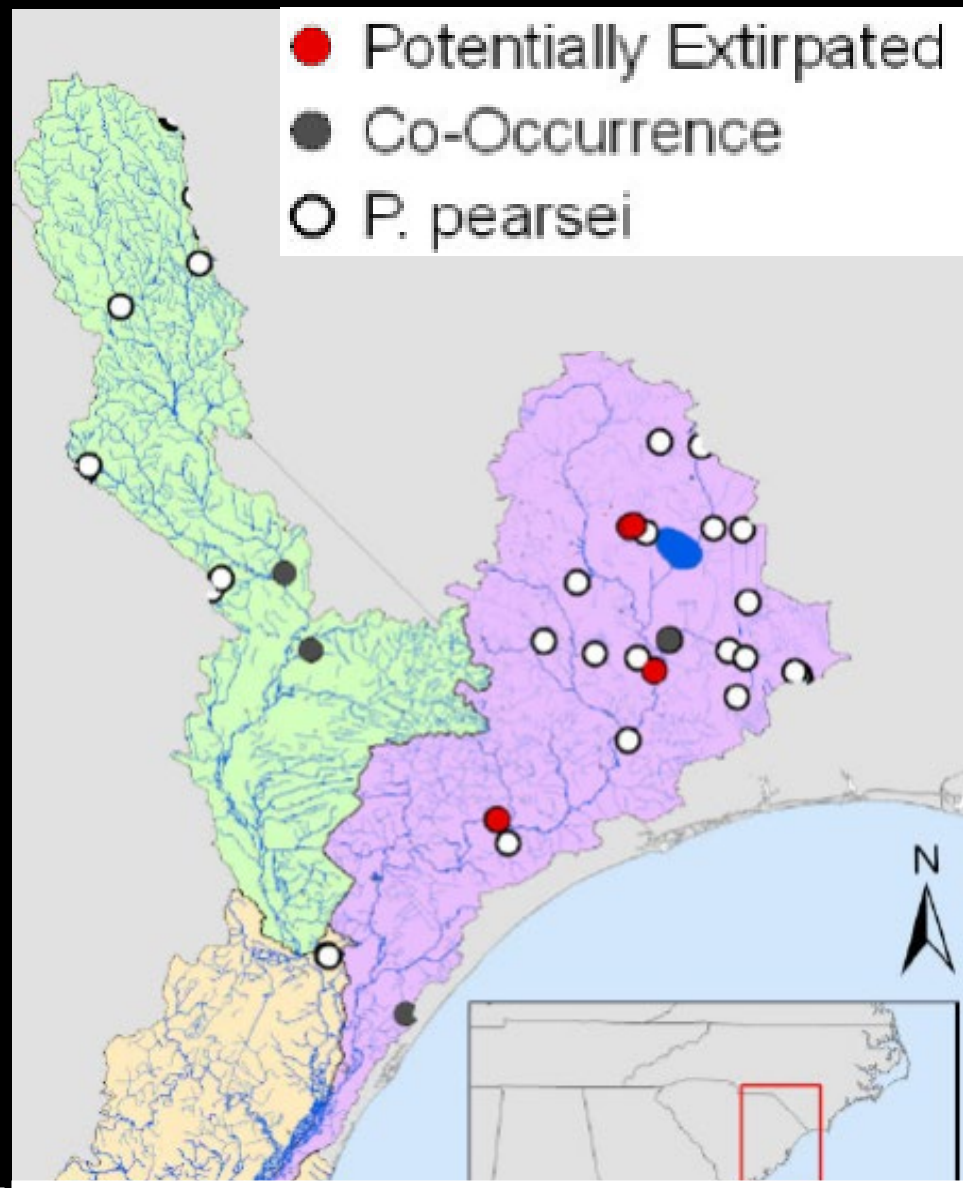

P. pearsei