

Mapping the Current and Future Supply and Demand of Ecosystem Services in the Carolinas

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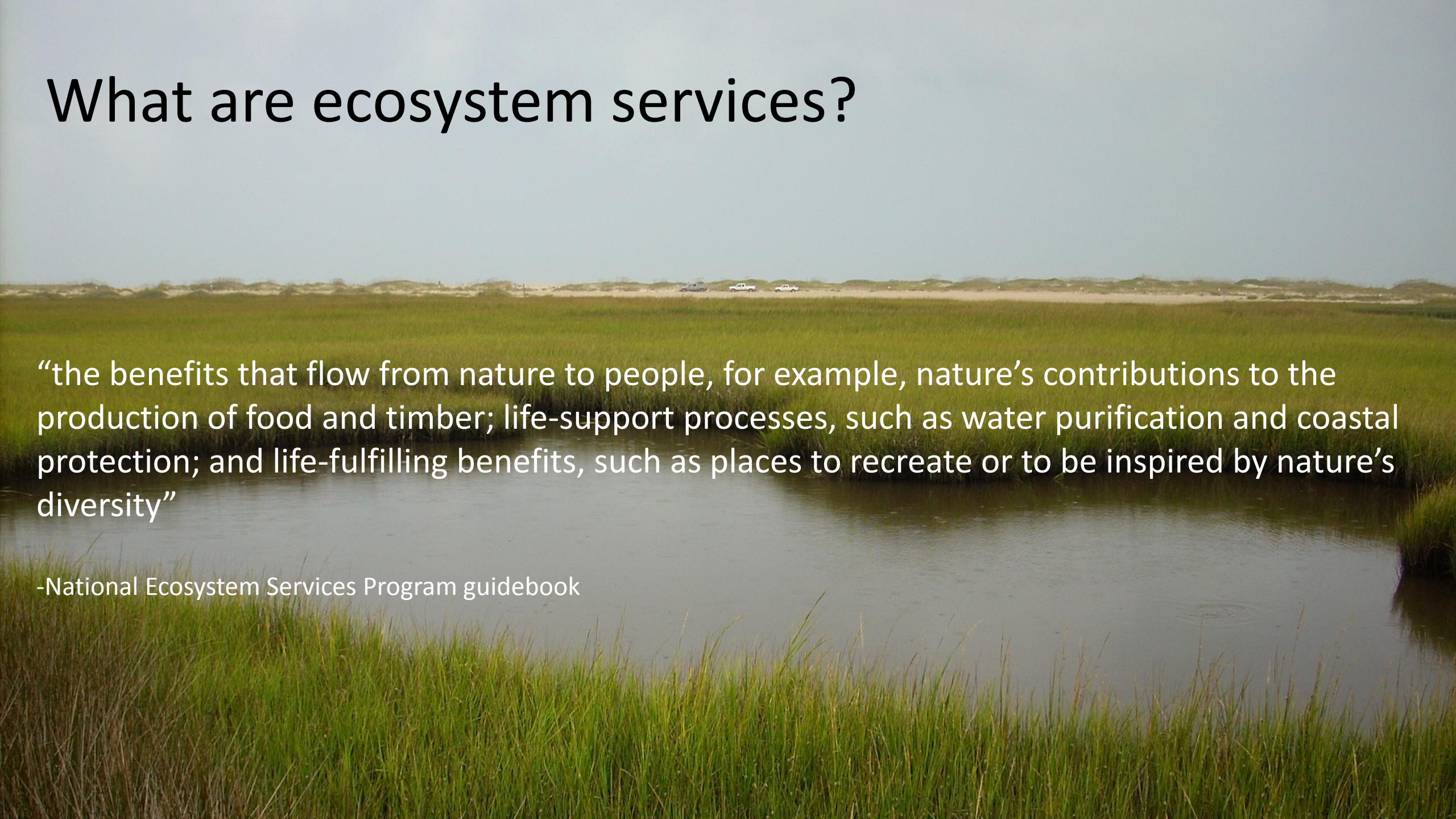
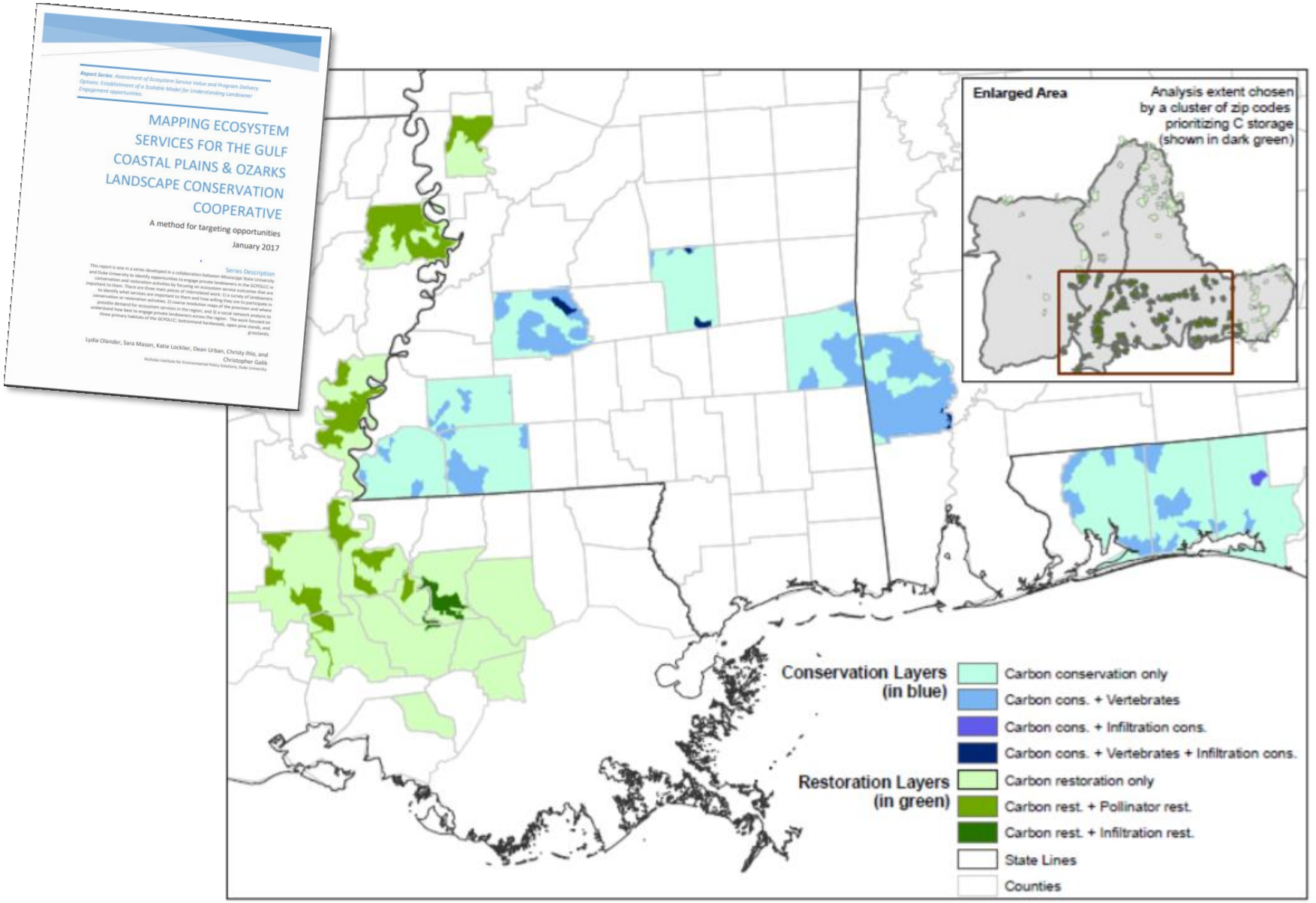
What are ecosystem services?



“the benefits that flow from nature to people, for example, nature’s contributions to the production of food and timber; life-support processes, such as water purification and coastal protection; and life-fulfilling benefits, such as places to recreate or to be inspired by nature’s diversity”

-National Ecosystem Services Program guidebook

Why are ecosystem services useful?



- Survey identified landowners' priorities for ecosystem services
- Spatial analysis mapped ecosystem service distribution and identified priority areas for conservation and restoration for each service

Olander et al. 2017

Mapping ecosystem services

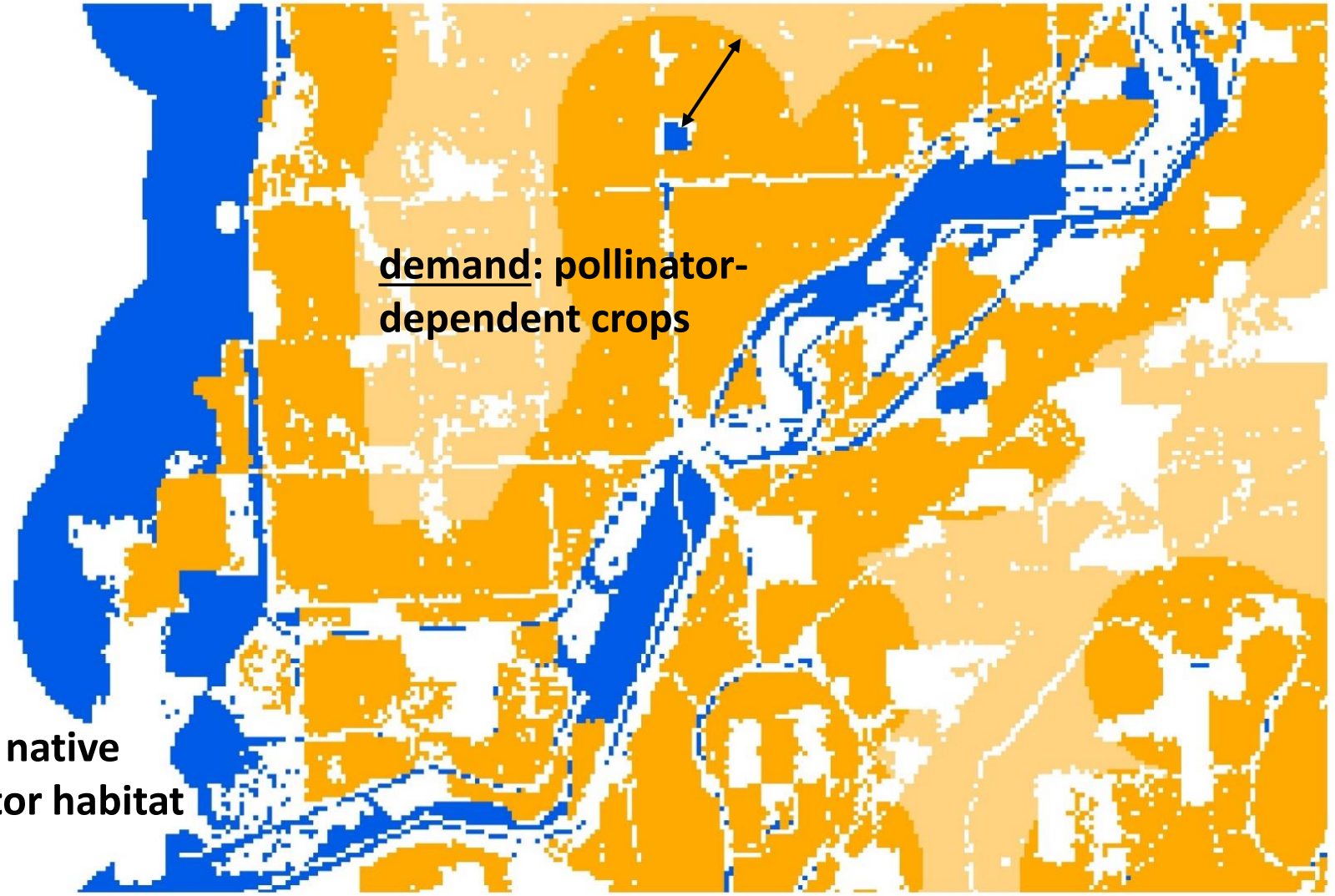
Considerations for mapping analyses:

- Publicly available data and non-proprietary methods
- Methods are easily updateable – not overly data- or computationally-intensive
- Large spatial extent (10 state region initially, scalable nationally)
- Capture information on actual use of service

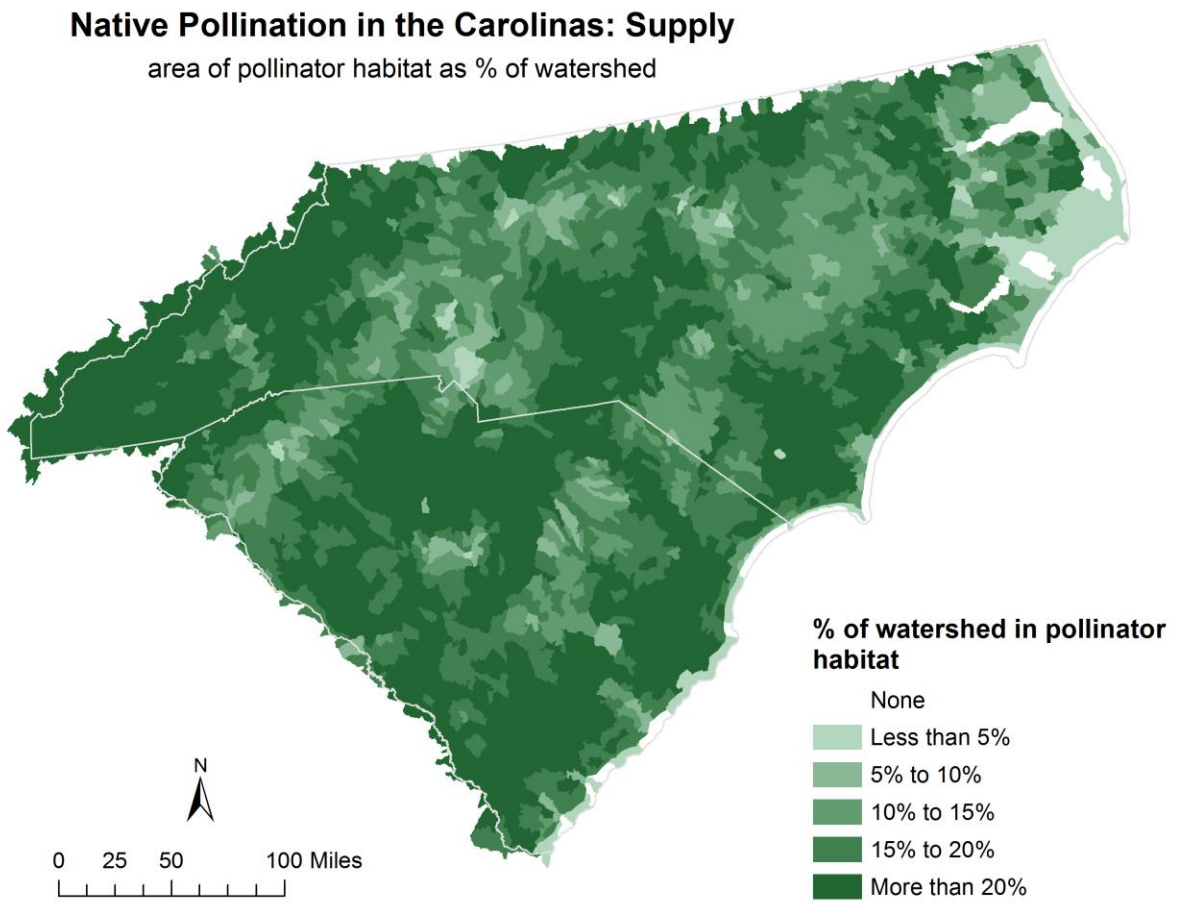
Current status of ES mapping analyses

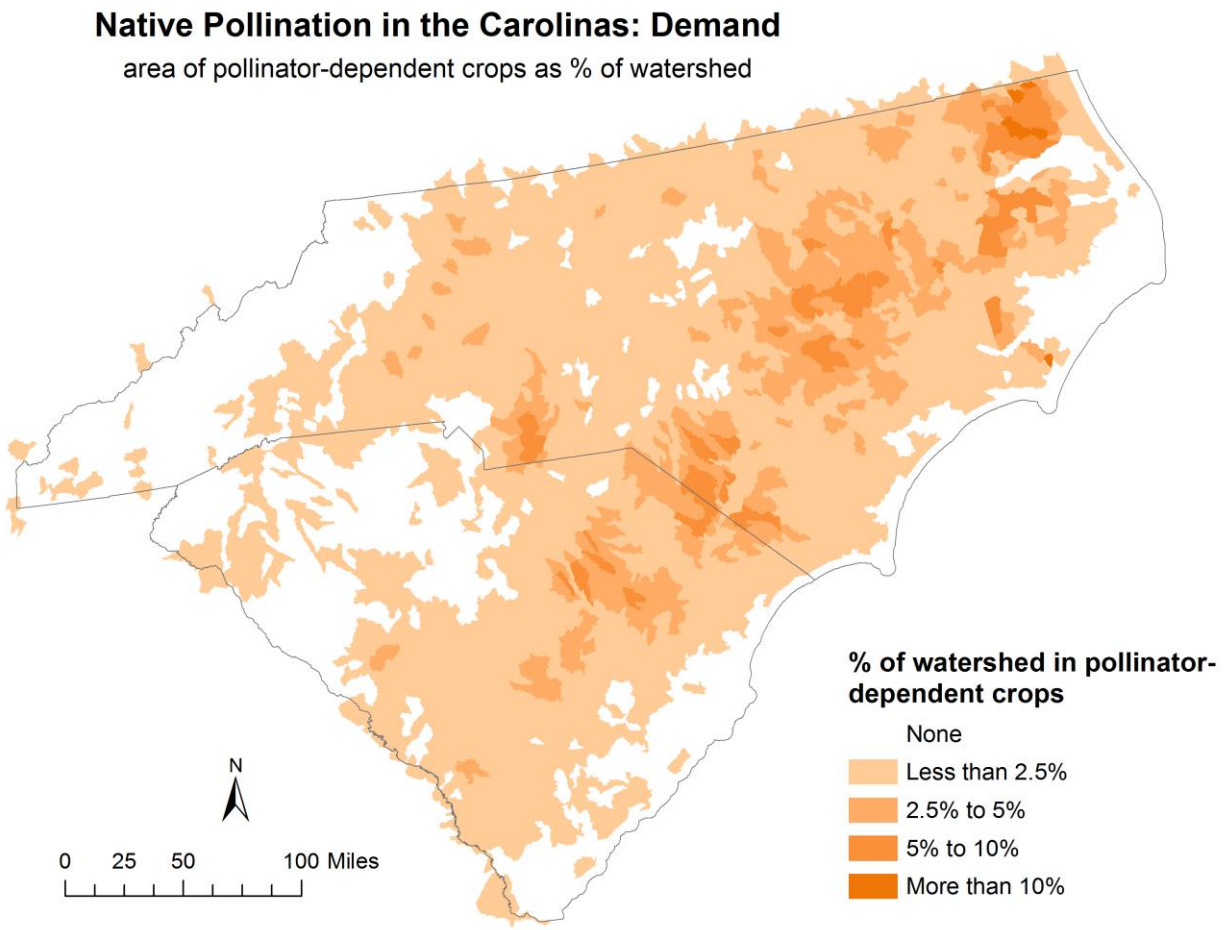
Analysis	Status
Native pollination potential	Complete
Recreational birding	Complete
Reduction of inland flood exposure	Finalizing
Water purification	Complete
Bird species richness	Complete
Reduction of coastal vulnerability	In progress
Green space recreation	In progress
Marine fishing	In progress

Mapping supply and demand for ES: pollination

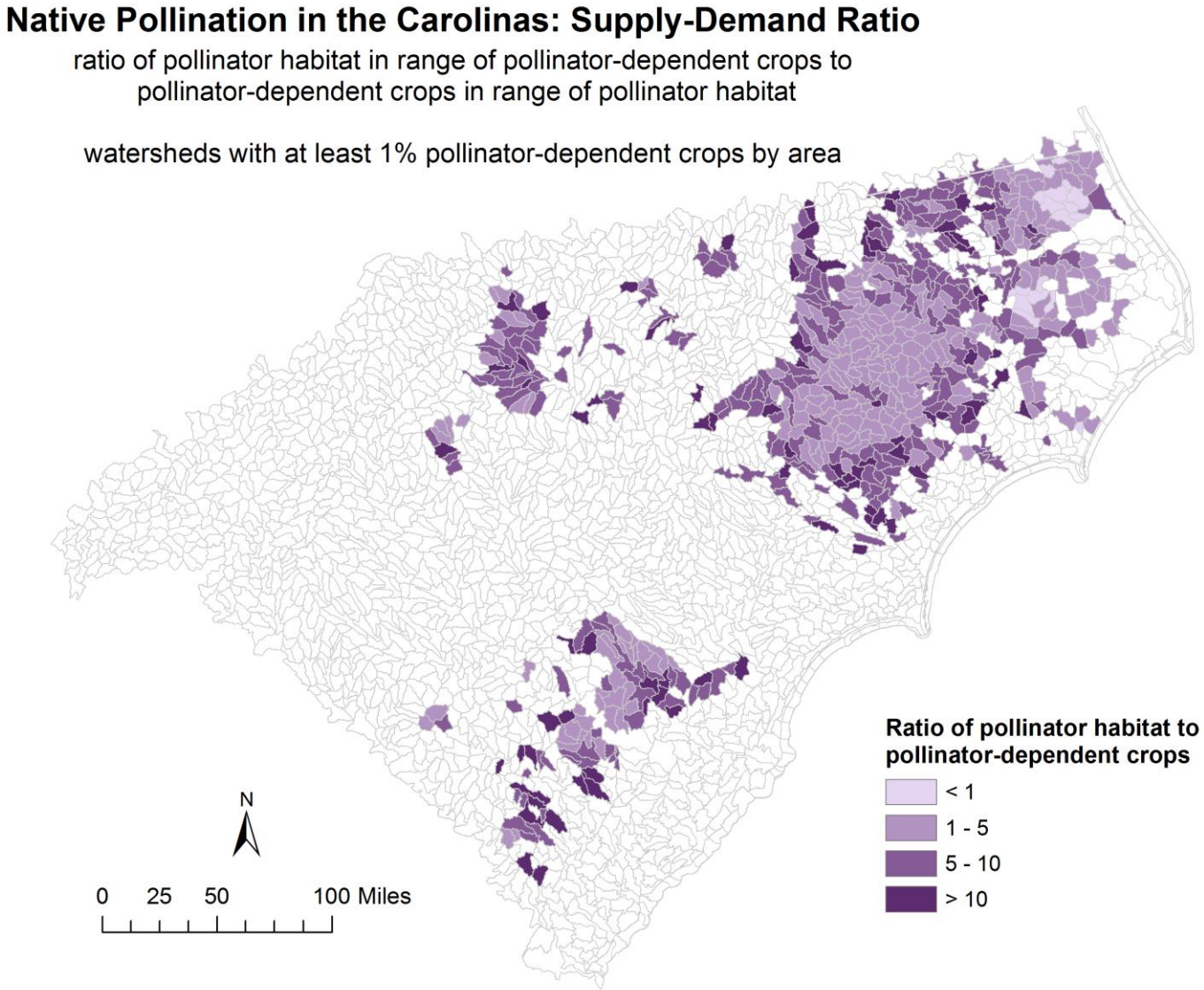


Mapping supply and demand for ES: pollination

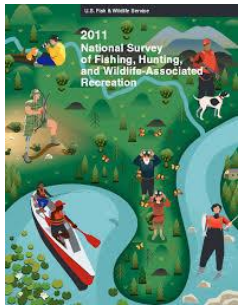




Identifying opportunities for restoration and conservation



Recreational birding



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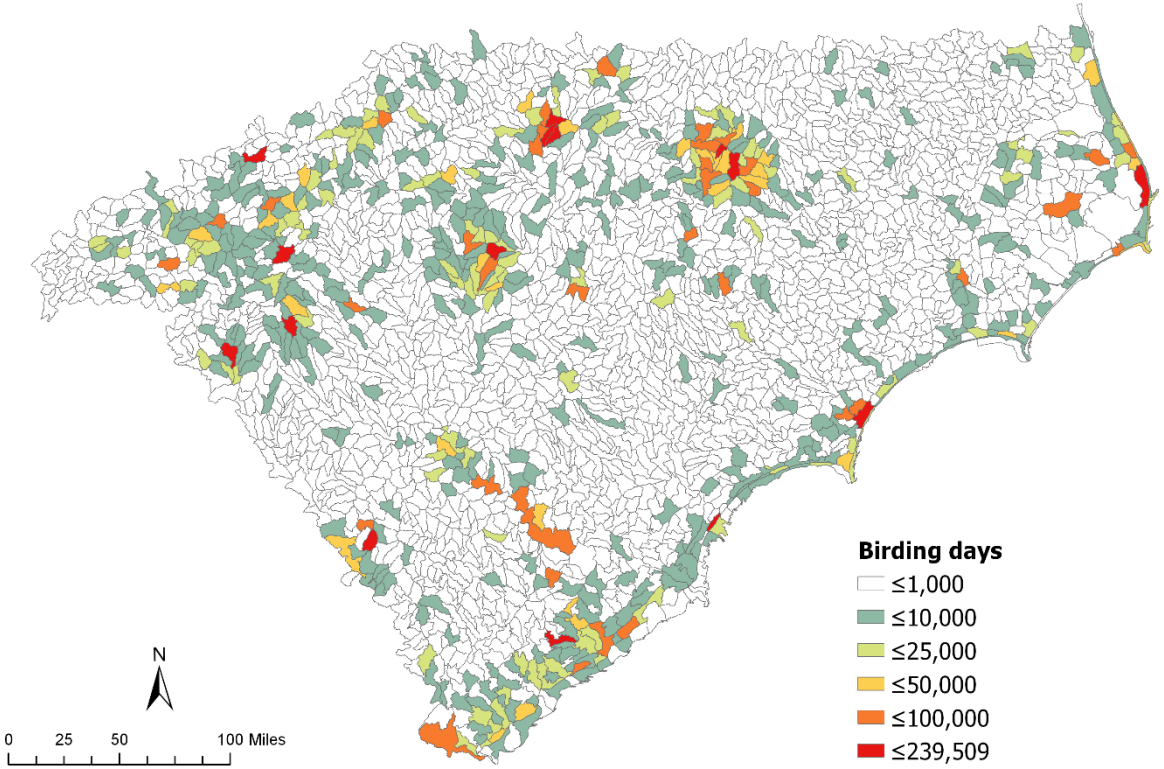
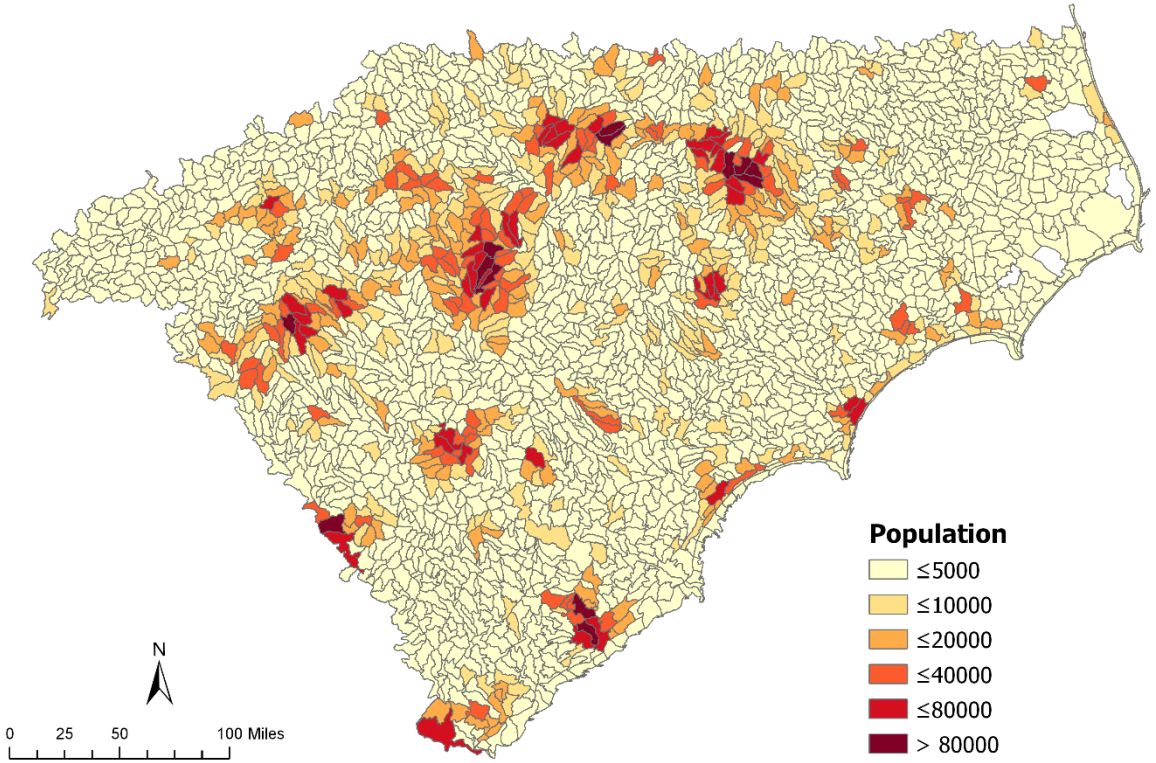
eBird

Recreational Birding Activity in the Carolinas, 2011



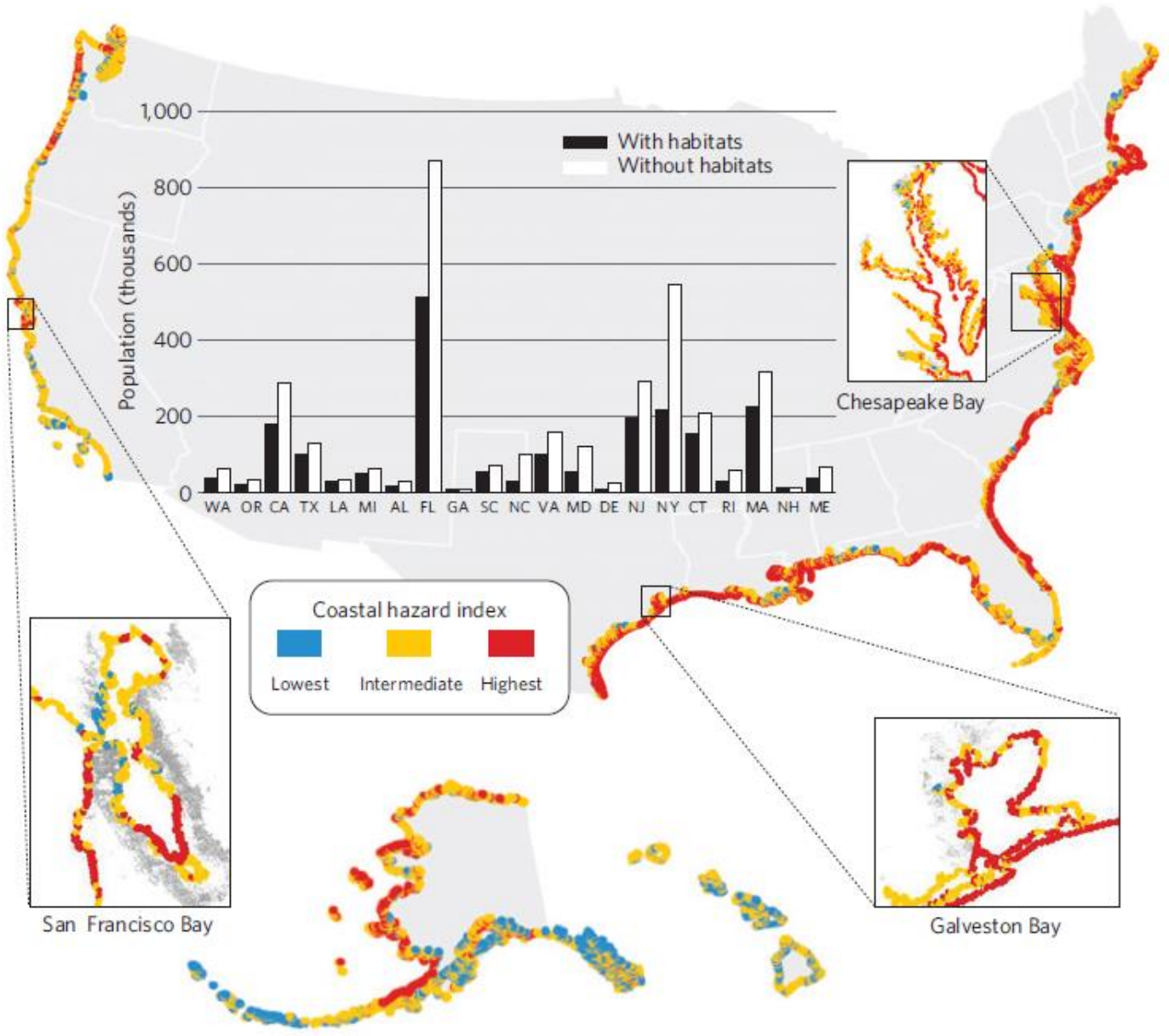
Population, 2011



Coastal vulnerability

InVEST model: coastal vulnerability

- Index-based, assesses relative vulnerability of shoreline segments to coastal storms
- Arkema et al. 2013 explored the influence of coastal habitats in mitigating risk by running model with and without these habitats
- Currently updating this analysis for the southeast (Atlantic and Gulf coasts)



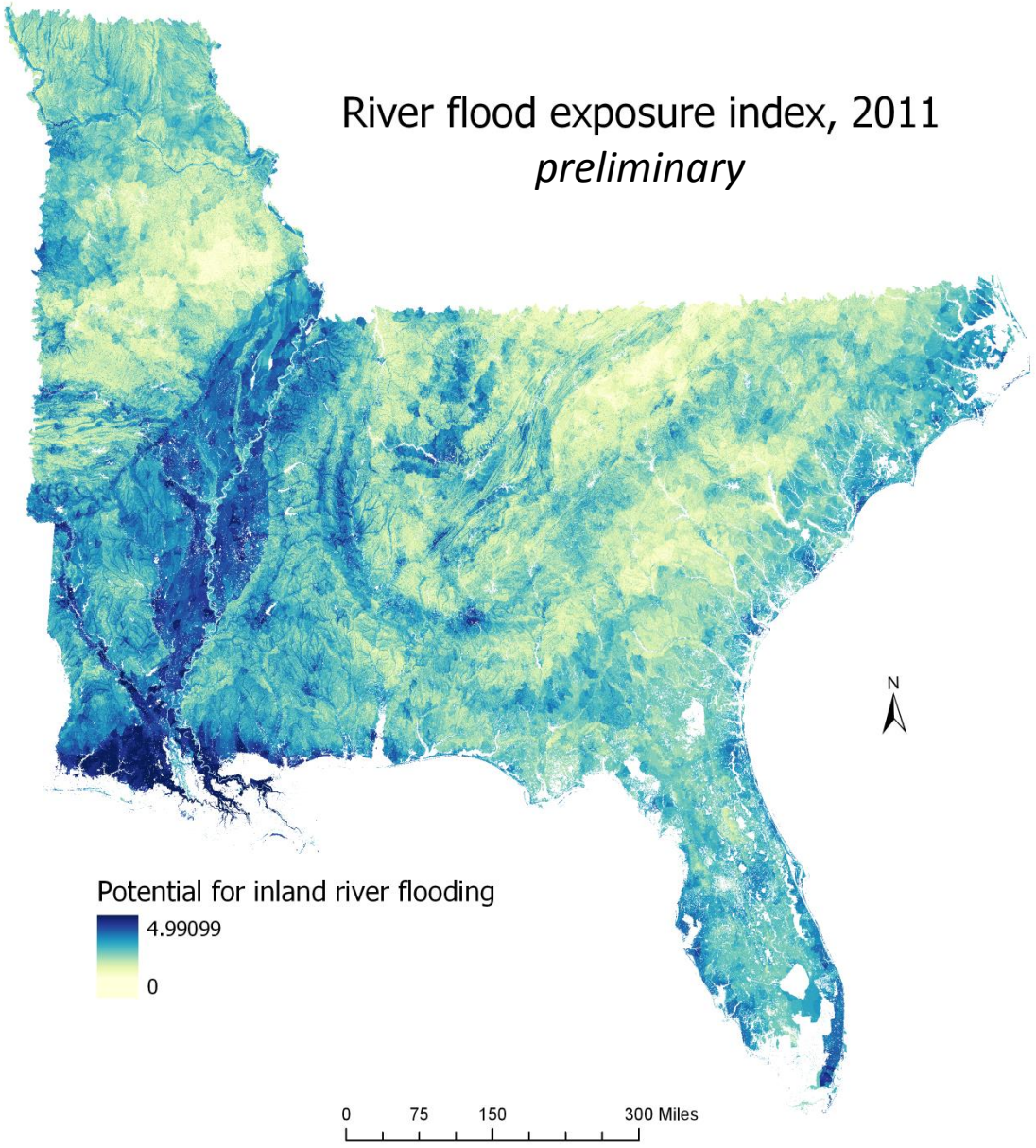
Arkema et al. 2013

Inland flood exposure and vulnerability

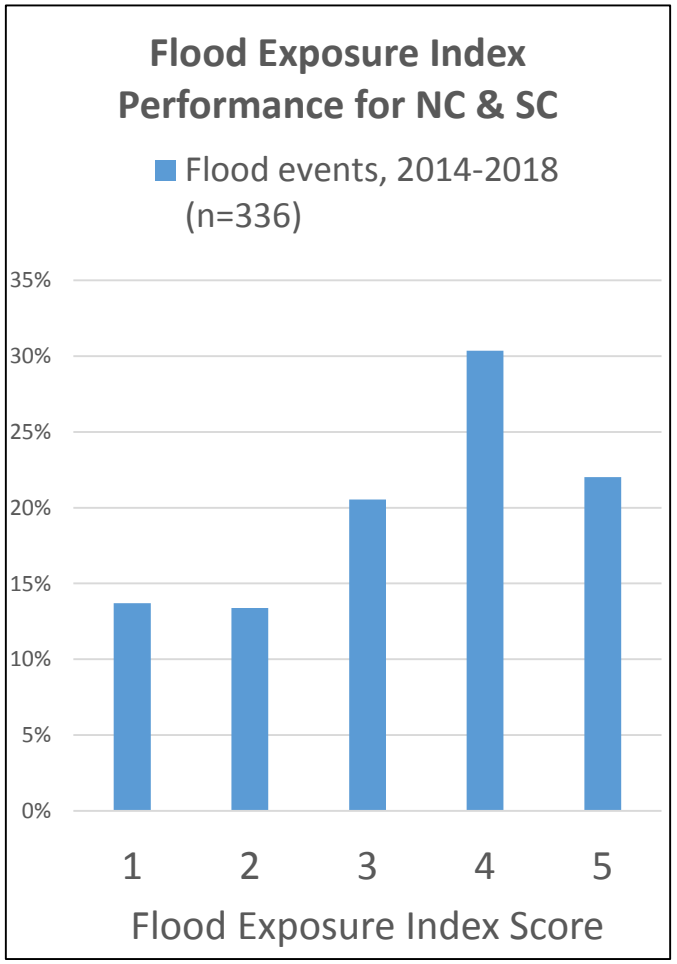
Adapted InVEST coastal vulnerability model to assess relative potential for inland river flooding driven by precipitation

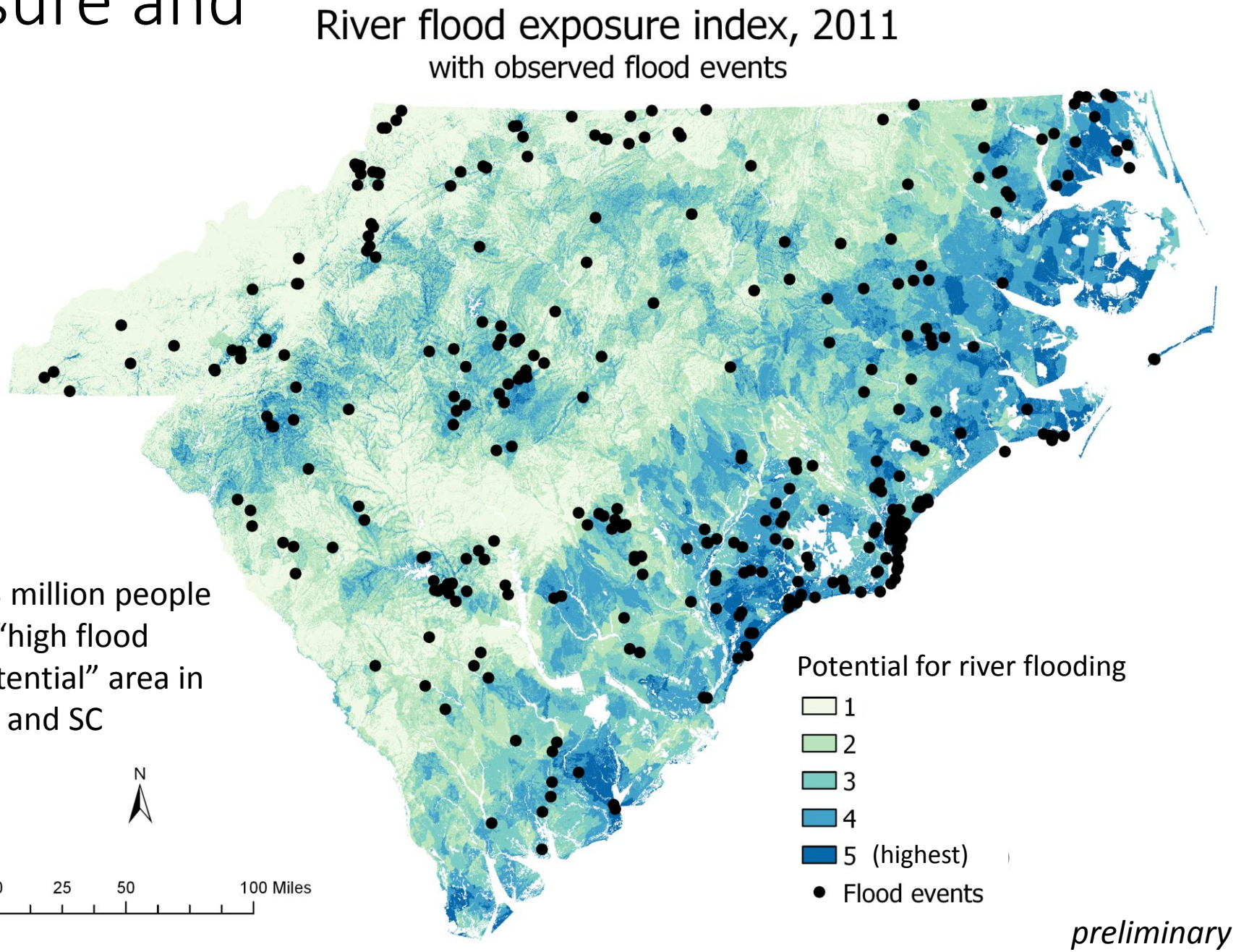
Variables included:

- Elevation above nearest waterway
- Precipitation intensity (2-day duration, 5-year return interval)
- Soil hydraulic conductivity
- Slope
- Natural land cover
- Impervious surface cover



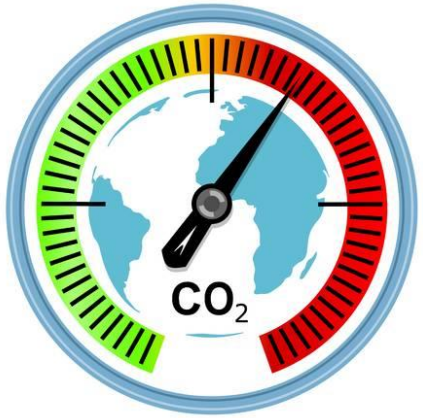
Inland flood exposure and vulnerability





preliminary

Future changes in ecosystem services



Climate change

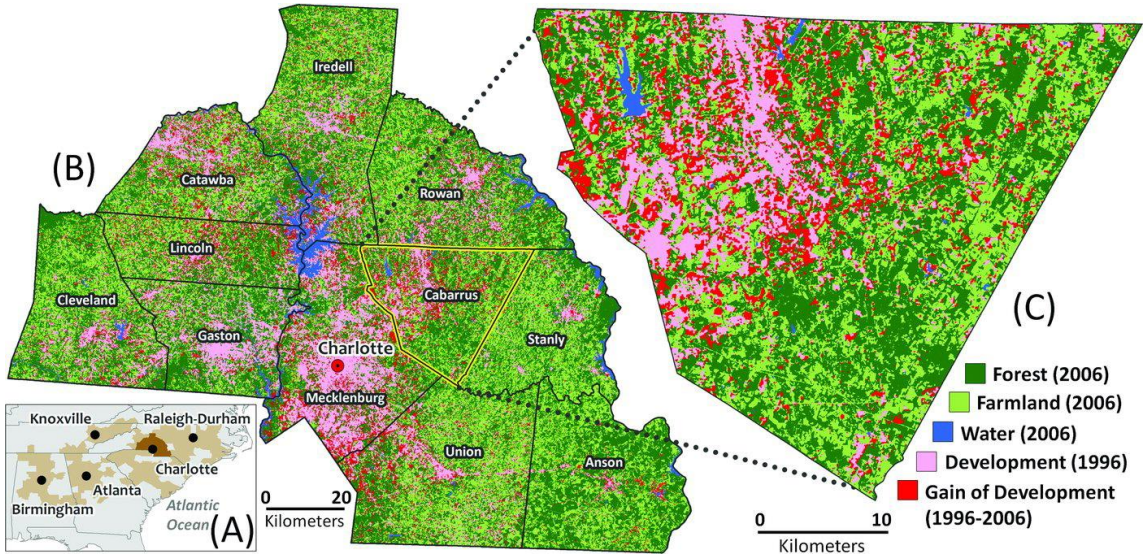
Population growth

Land use change

Ecosystem Services

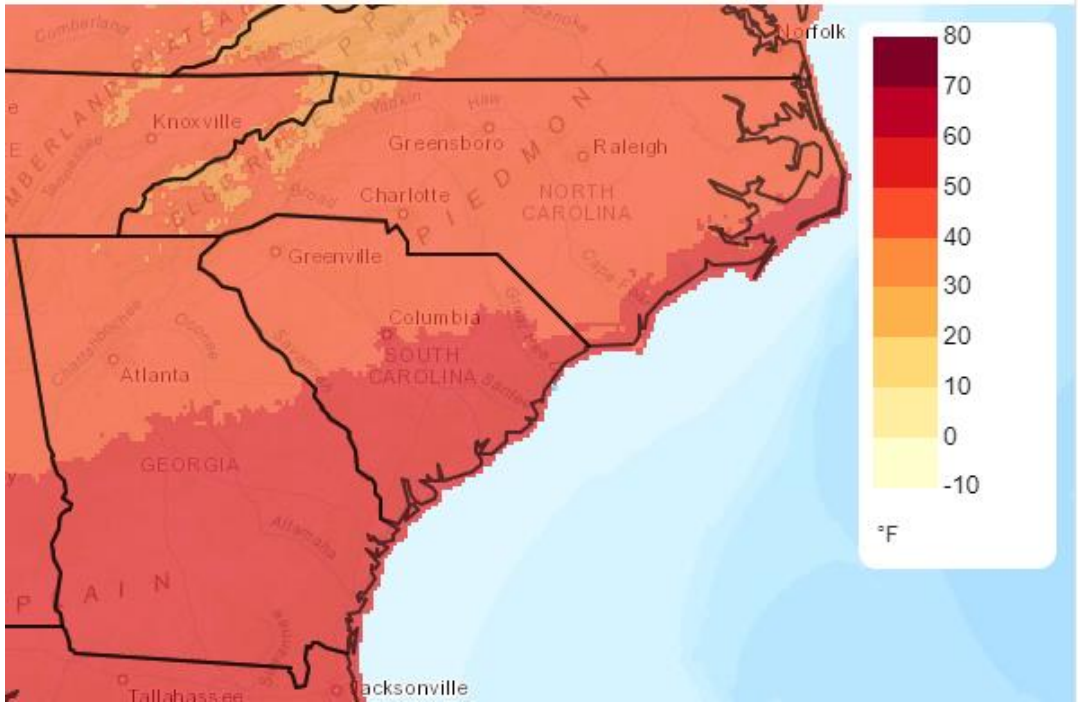
Next steps: Adding future changes

Projected development: FUTURES model



Meentemeyer et al. 2013

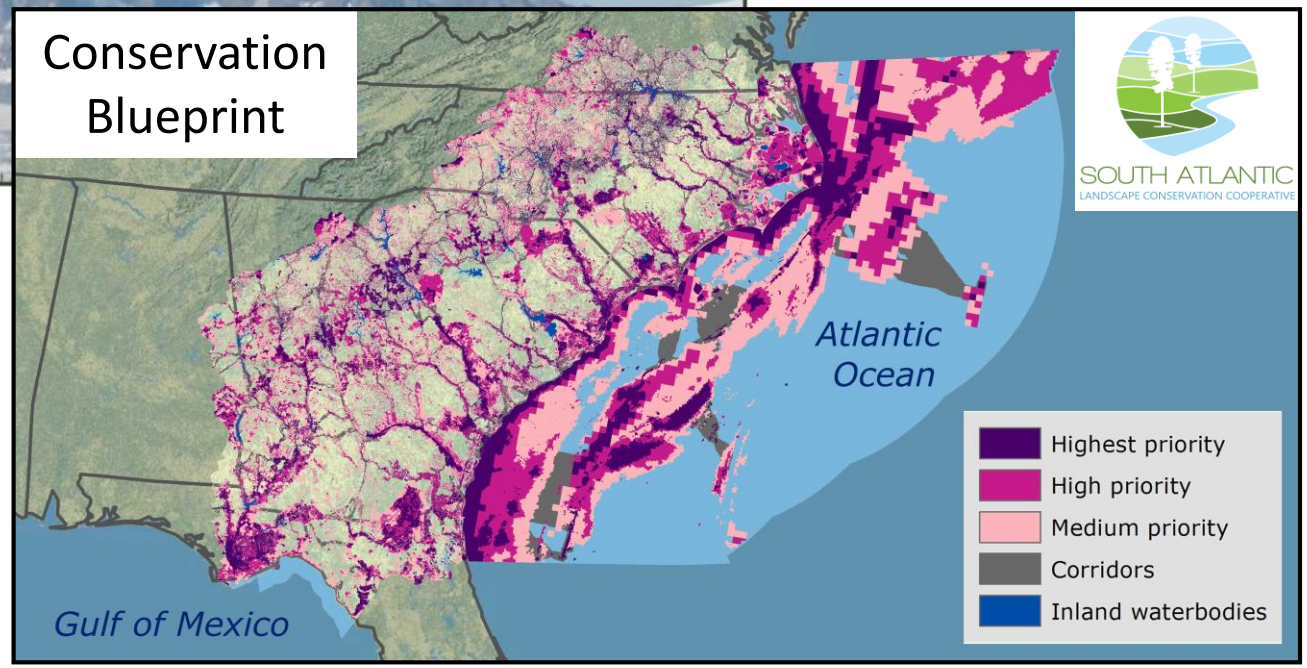
Downscaled climate projections



MACA mean winter temperature,
2070-2099, RCP 4.5, multi-model mean
Abatzoglou & Brown 2012

Next steps: Integration into planning efforts

SERPPAS
Southeast Regional Partnership for Planning and Sustainability



Questions?

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This project is supported The Department of the Interior Southeast Climate Adaptation Science Center, which is managed by the USGS National Climate Adaptation Science Center.

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