Sea Level Rise Implications for Eastern North Carolina

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NCBIWA

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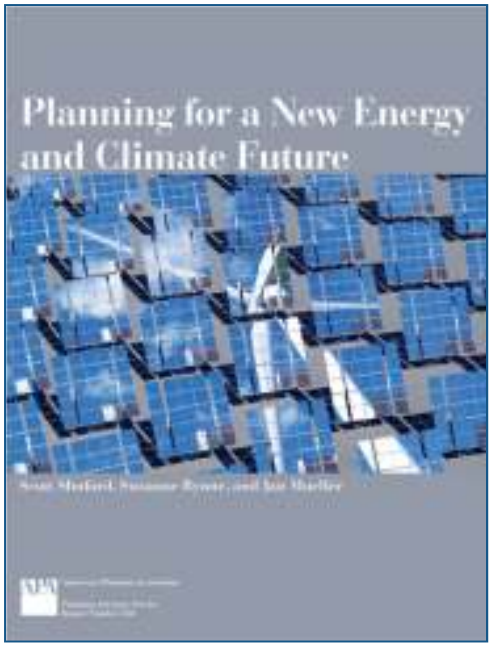
About me

- Planning consultant
  - CASE Consultants International
- IPCC FAR – 2007
  - Hired by NOAA/UNCA
  - Co-author of APA PAS report



- Co-author of APA Climate Change Policy Guide

Causes of sea level rise

- Thermal expansion
- Melting of land-based ice (glaciers, ice sheets)
- Subsidence
- Changes to ocean currents

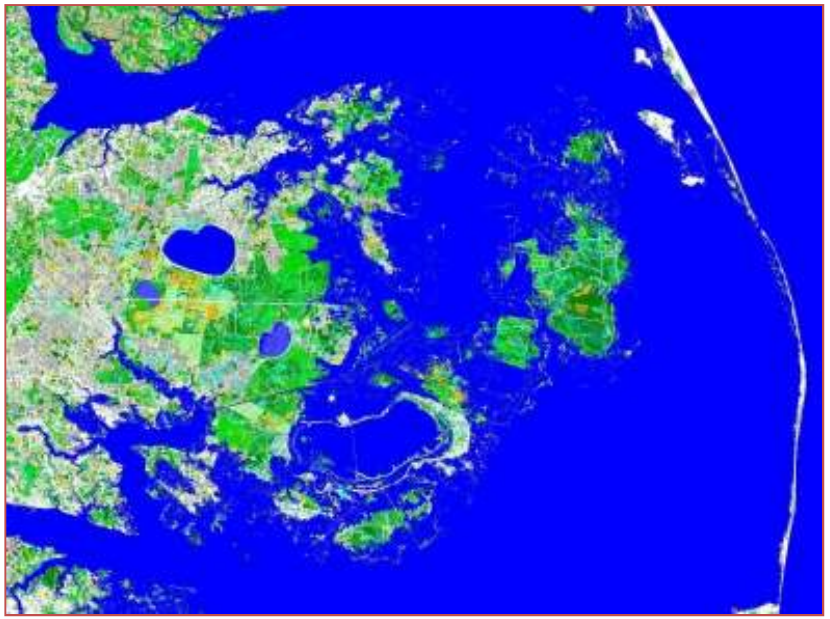
Sea level rise in NC

48.5 cm or

~19 inches

Federal Department of Transportation

Sea level rise in NC

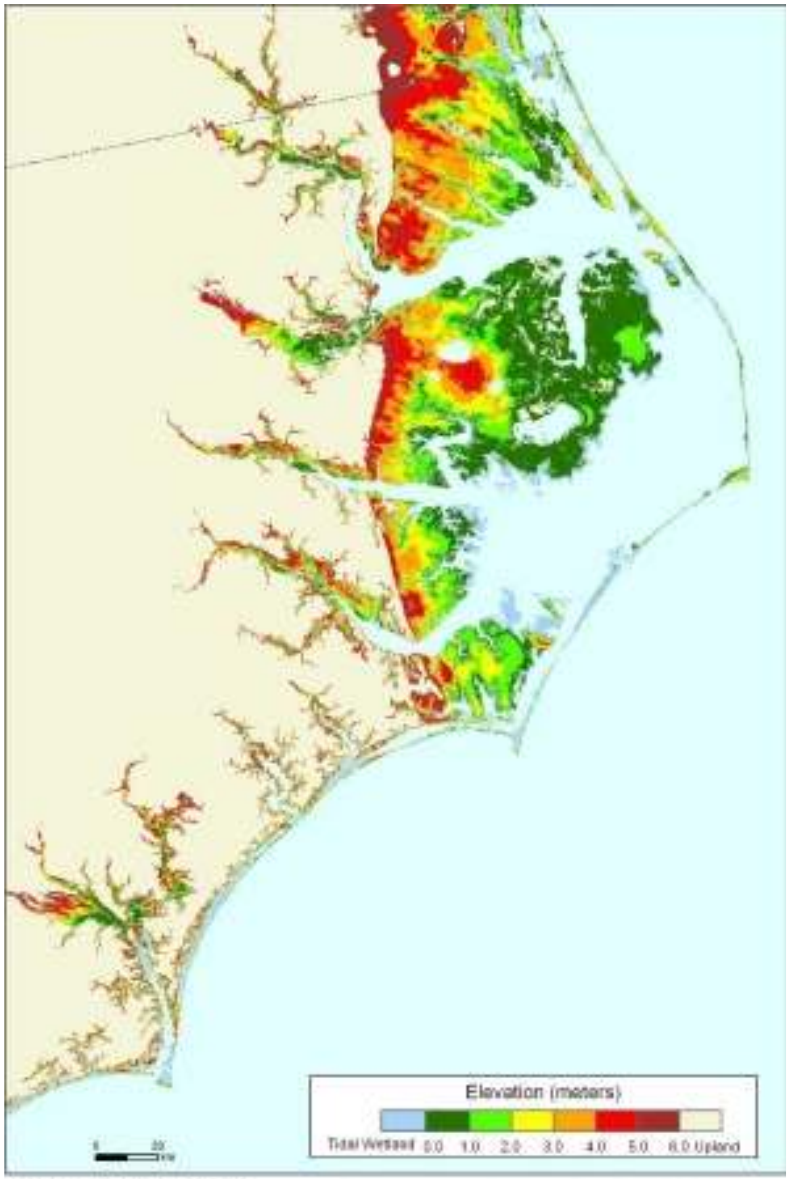


Graphics courtesy of The Nature Conservancy

2 feet

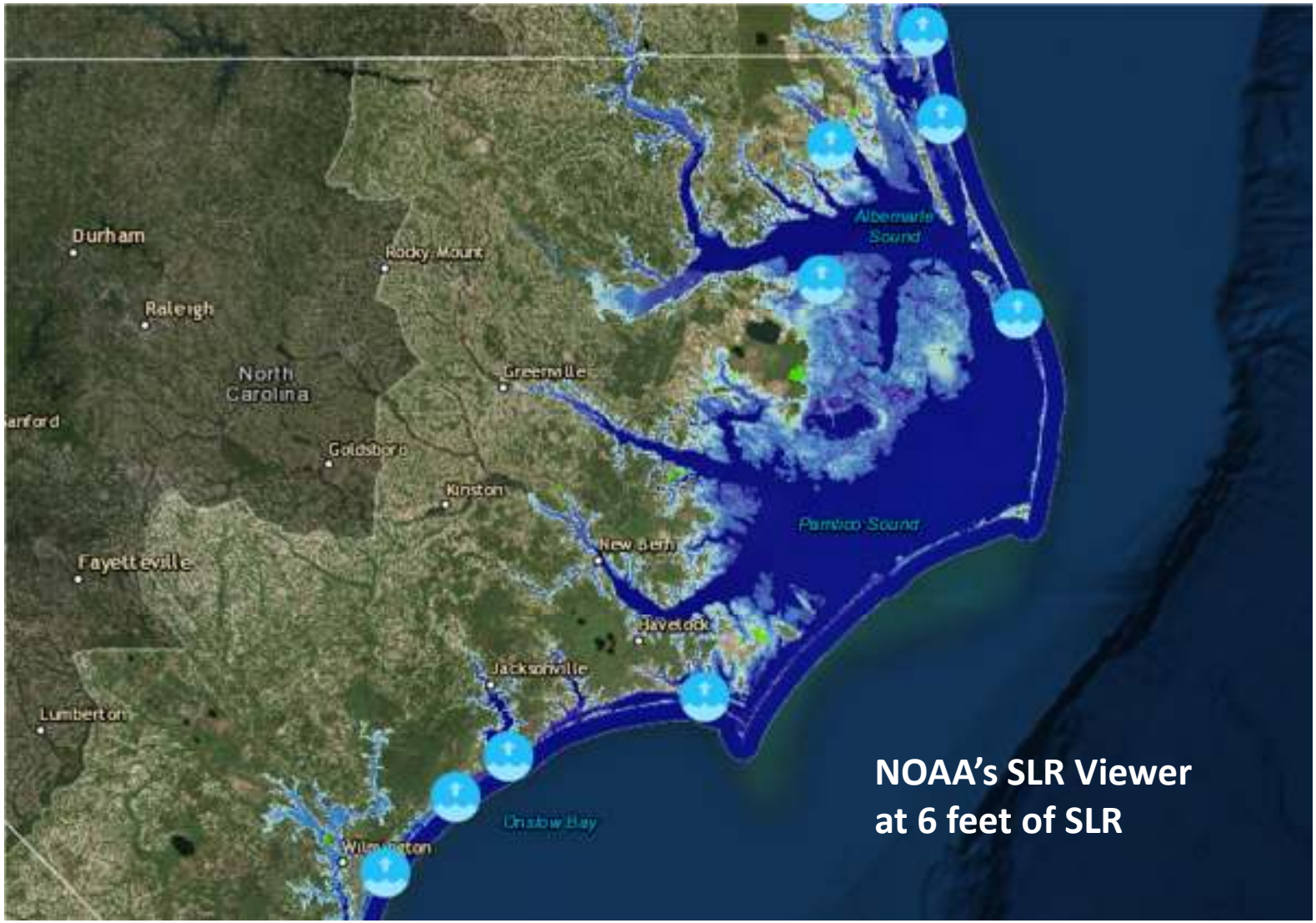
Sea level rise in NC

One meter (~40”) of SLR

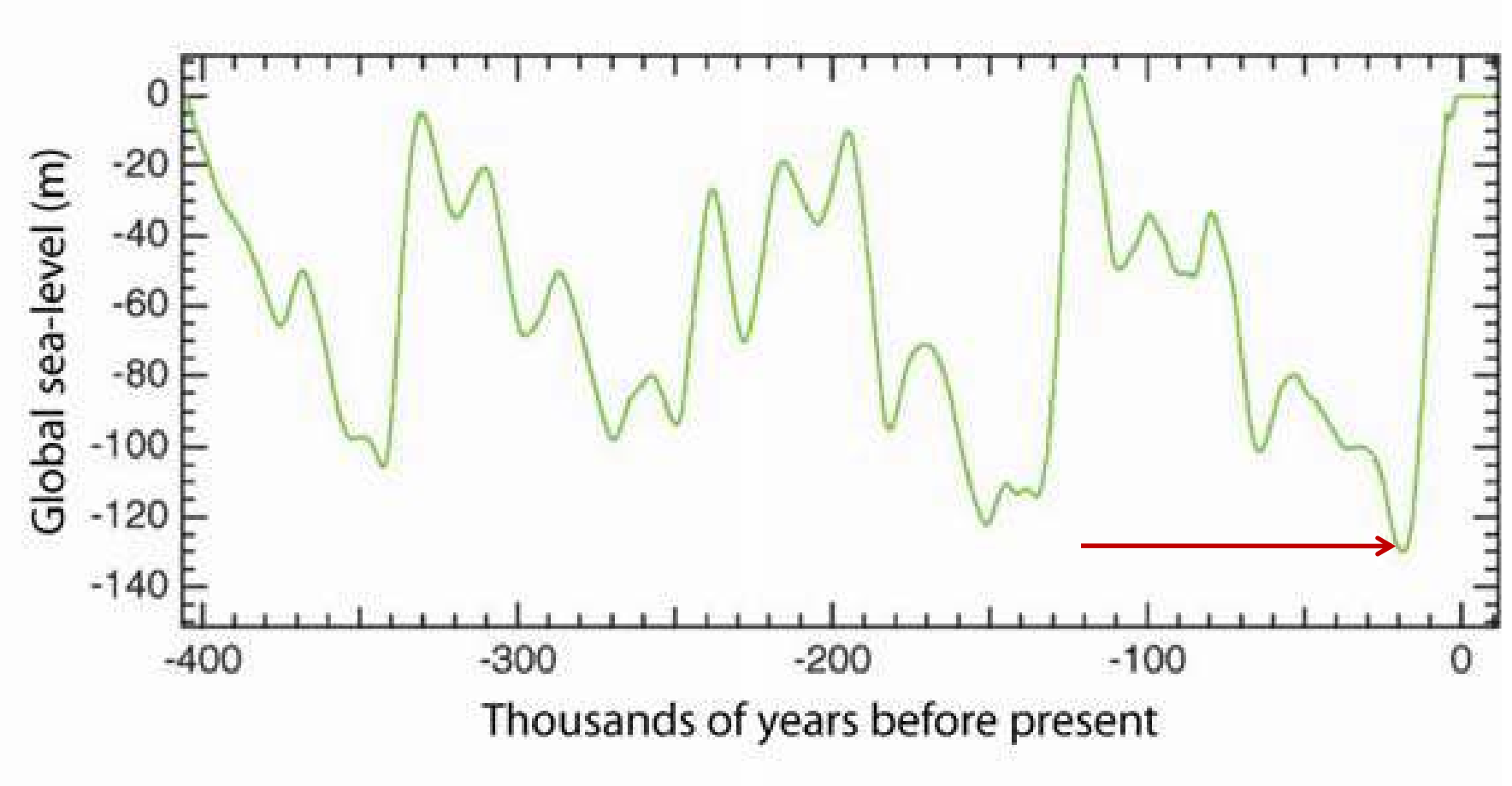


Elevations of Land Close to Sea Level
Elevations are above spring high water, which is the average high tide during new and full moons, and approximately the inland boundary of tidal wetlands. This map is a general graphical representation of elevations in the area depicted, not designed to estimate the precise elevations at specific locations. Actual elevations at specific locations may be 30 cm above or below the elevation shown.
Source: J.G. Titus and J.Wang. 2008. "Maps of Lands Close to Sea Level along the Mid-Atlantic Coast".
US Environmental Protection Agency

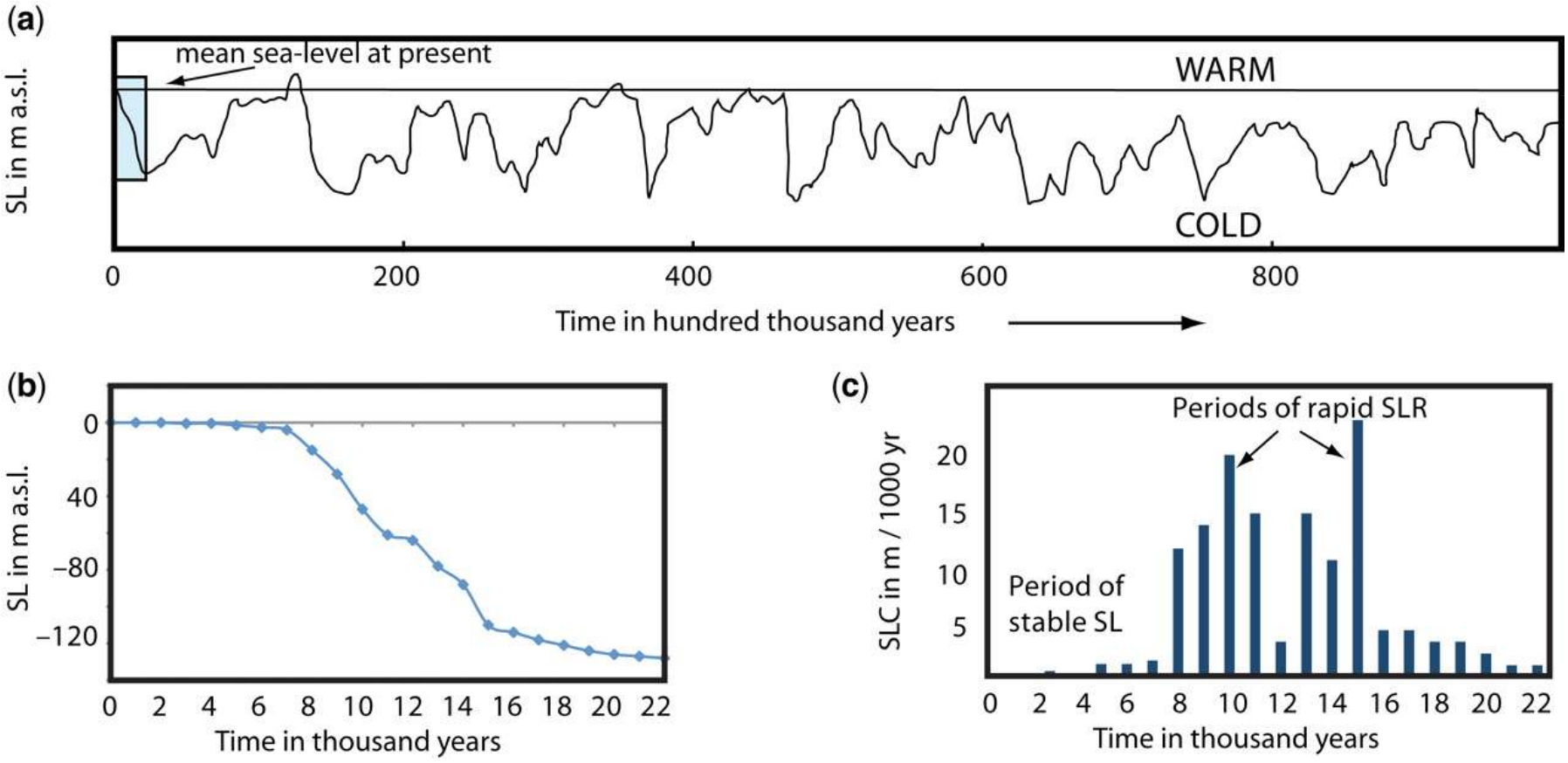
Sea level rise in NC – 6 feet



Historic sea levels

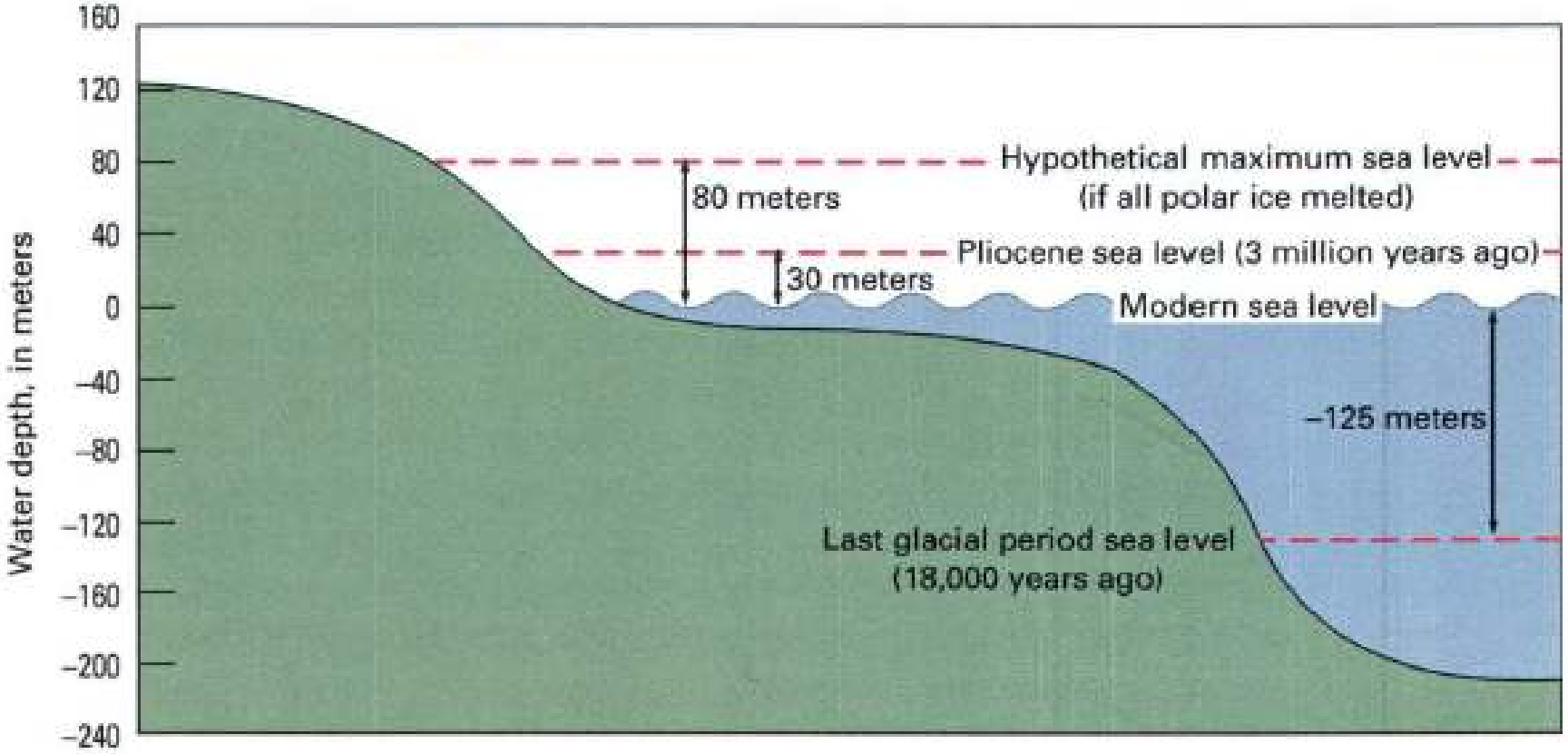


Historic sea levels



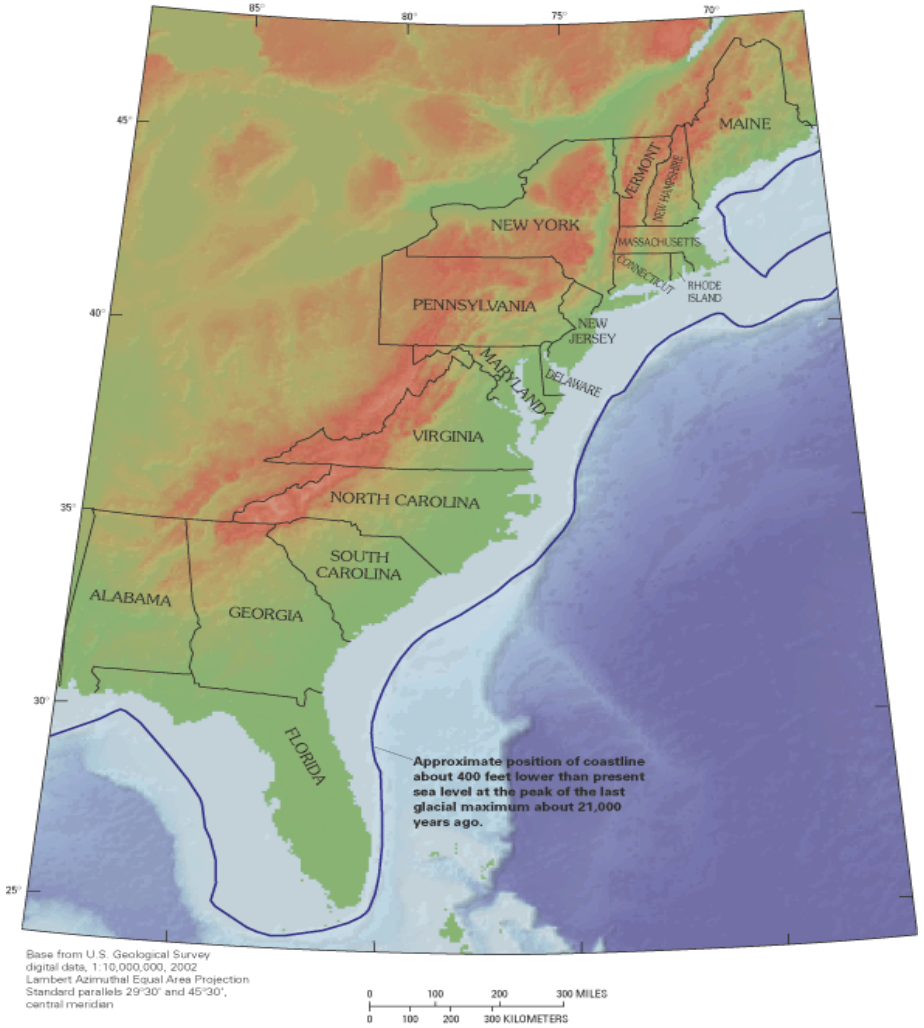
London Geological Society

Historic sea levels



USGS figure from brochure

Historic sea levels



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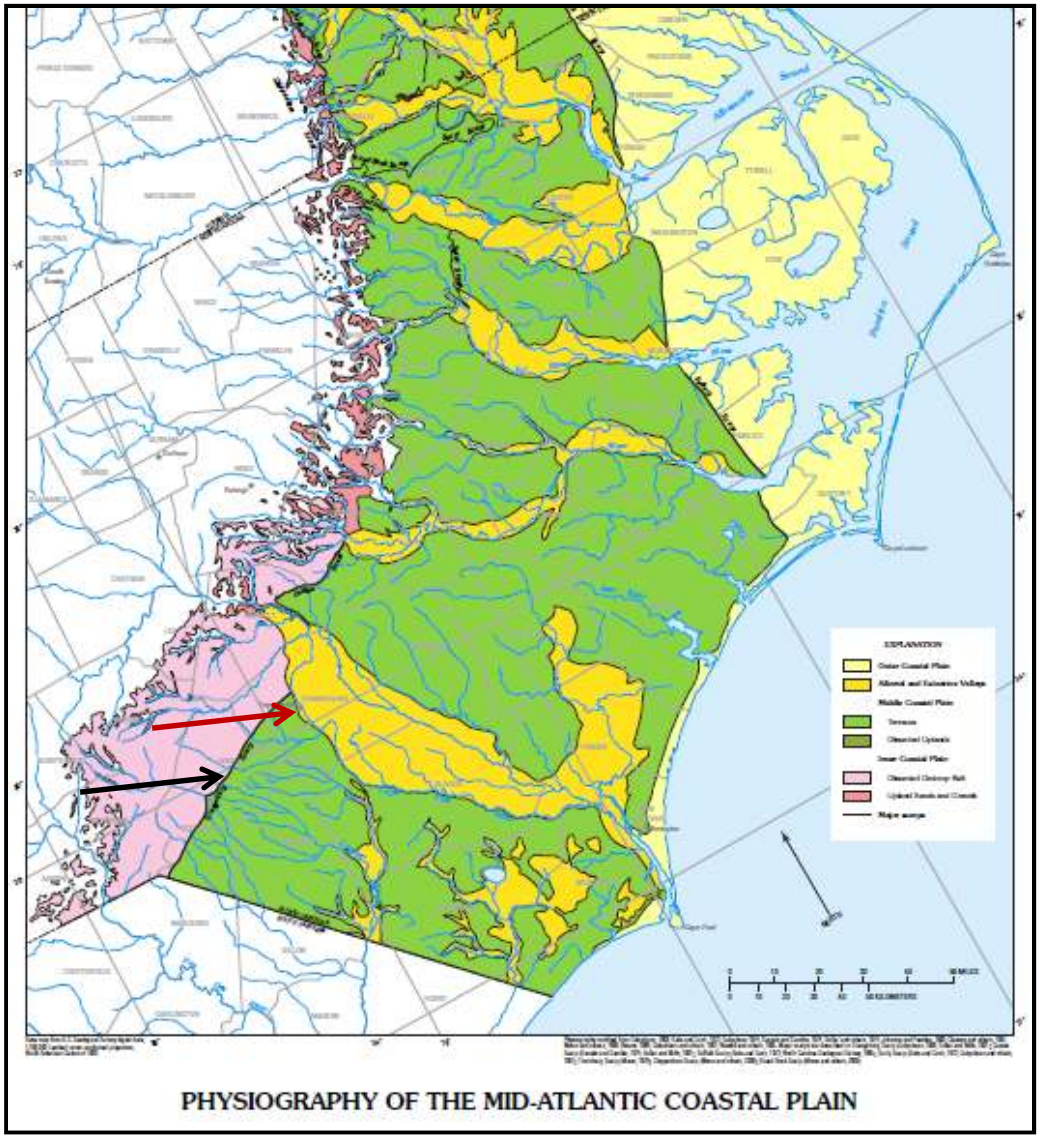
Historic sea levels



USGS

KEY

Orangeburg Scarp →

City of Fayetteville →

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SLR is more than just inundation

- Storm surge magnification
- Salt water intrusion
- Disruption of ocean outflows (e.g., rivers, drainage ditches)
- Infrastructure degradation
- Insurance – availability and affordability

Adaptive responses

- Evaluate “risk”
  - “Risk” is your level of exposure to an event relative to the likelihood of that event happening
  - For SLR, exposure is significantly related to elevation above sea level and to time
  - SLR is extremely likely and its impacts will increase over time but its extent is not certain
- Respond accordingly to the level of risk, based on client/community tolerance for risk and best information available

Adaptive responses

Greater exposure	Less exposure
Project is long-term	Project is short-term
Project is more costly	Project is less costly
Project is lower elevation	Project is higher elevation

Adaptive responses

Adaptive responses

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Decision-making

- Beach nourishment project
- Seawall
- Paved road
- Rail line
- Sewage treatment plant
- Major bridge

Planning ahead

- Retreat
- Fortification
- Abandonment
- Migration
  - Industries
  - Residents

Conclusions

- SLR will significantly reshape coastal NC regardless of its ultimate extent
- It will be necessary to evaluate adaptive responses using risk-based analysis
- Difficult choices will be required; these choices should be informed by the best available data, but there will always be an element of uncertainty

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QUESTIONS?

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