



North Carolina

Climate Action Plan Advisory Group

Background for a Process on Adaptation to Climate Change in North Carolina

January 16, 2008

The Center for Climate Strategies

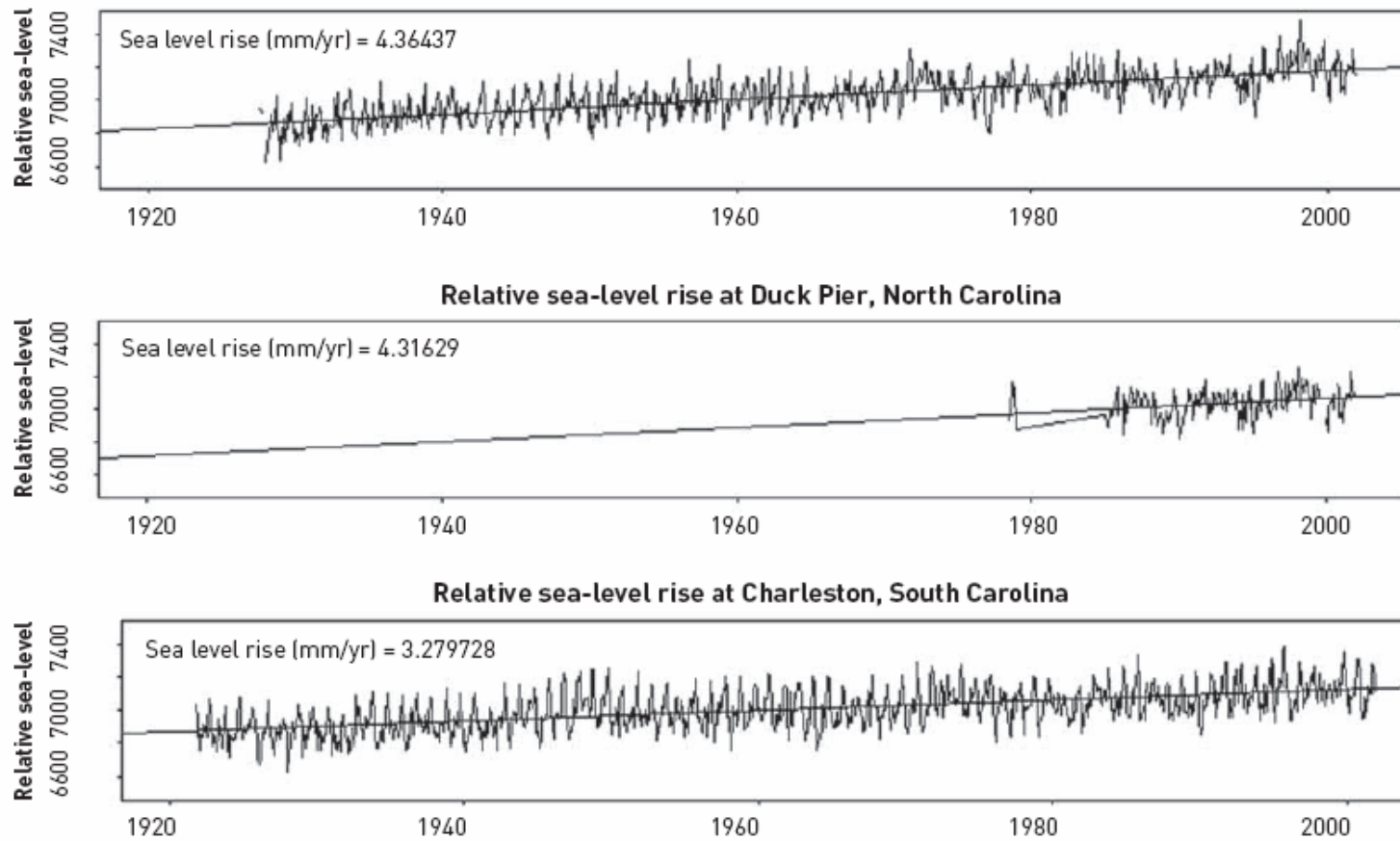
Initial Questions

- What is of concern?
 - Coastal areas?
 - Water resources?
 - Human health?
 - Agricultural production?
- Who/what are affected?
 - Homeowners?
 - Farmers?
 - Small businesses?
 - Citizens' health and safety?
- How far into the future?
 - Current risks v. long-terms risks?

Initial Questions (continued)

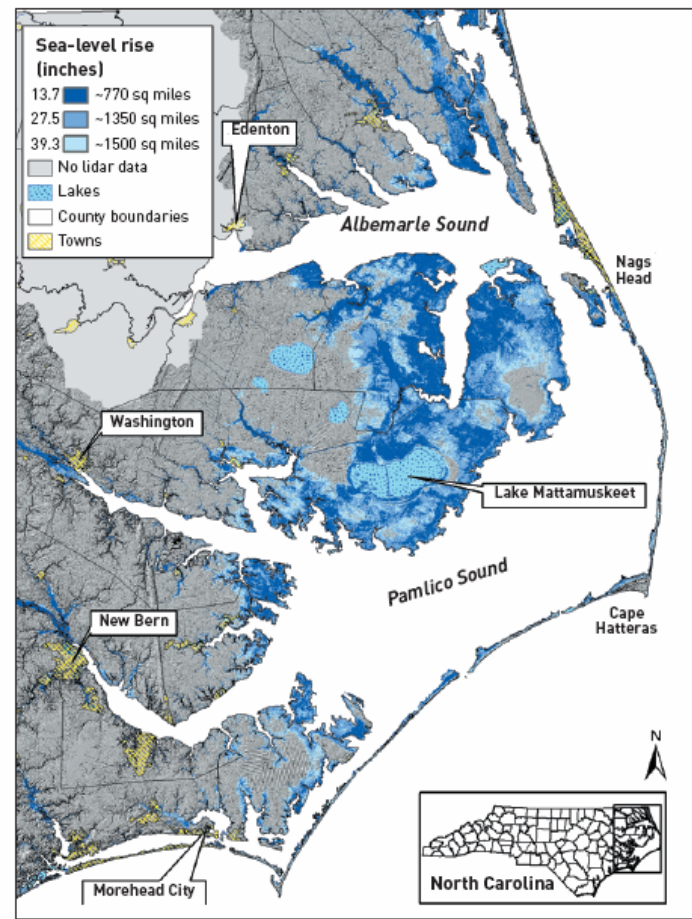
- For what purpose is the process?
 - Raising awareness?
 - Making policy?
 - New legislation?
- What kinds of outputs are needed?
 - Research studies?
 - Near-term adaptation actions?
 - Long-term policy direction setting?
- What resources are available?
 - Time?
 - Capacity?
 - Funds?

Climate Change Risks in NC – Sea Level Rise



Source: Ben Poulter, Duke University, as cited in "Understanding Global Warming for North Carolina" by A. Munger and M. Shore

Climate Change Risks in NC – Sea Level Rise (cont'd)



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Other Risks for NC from Climate Change

- Higher temperatures would lead to air quality problems and accompanying health problems
- The natural environment of NC will likely be altered
- The state economy will likely be adversely affected.

Vulnerability to the Risks of Climate Change

- Vulnerability is the level of risk associated with adverse impacts of climate change on NC resources and economy
- Vulnerability is a function of:
 - Exposure (to climatic extremes and volatility)
 - Sensitivity (to that exposure)
 - Adaptive capacity (the State's ability to adapt)

Exposure

- What specifically is at risk in NC?
 - Populations
 - Resources
 - Property
- What will be affected in NC?
 - Sea level
 - Temperatures
 - Rainfall
 - Frequency of extreme events

Sensitivity

- What specifically are the physical effects of climate change in NC?
 - Rainfall runoff?
 - Crop yields?
 - Demand for electricity and other energy forms

Adaptive Capacity

- What specifically is the ability of NC to adapt?
Typically, a function of
 - Wealth
 - Technology
 - Institutions
 - Legislation
 - Public awareness
 - Infrastructure

Vulnerability Is Affected by Interactions Between All Three

- More exposure and sensitivity increase vulnerability
- More adaptive capacity decreases vulnerability
- Any process in NC should consider all three factors

Adaptation Option Design Template

- Option Description (Concept)
- Option design (Targets, timing, parties involved, other)
- Implementation Mechanisms
- Related Policies/Programs in place
- Estimation of adaptation options relative to
 - Costs
 - Flexibility
 - Adaptive capacity
 - Other
- Documentation of adaptation benefits and costs
 - Data sources
 - Quantification methods
 - Key assumptions
 - Key uncertainties
 - Additional Benefits and Costs
 - Feasibility Issues, if Needed
- Status Of Group Approval
- Barriers to Consensus

Adaptation to Climate Change

- The IPCC defines adaptation to climate change as:
 - “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (Third Assessment Report, Working Group II)

Two Major Types of Adaptation to Climate Change

- Autonomous or reactive adaptation: tends to be what people and systems do as impacts of climate change become apparent
- Anticipatory or proactive adaptation: measures taken to reduce potential risks of future climate change
- The latter type is what an NC adaptation process would focus upon

Potential Adaptation Options

- CCS has developed a catalog of options for the following vulnerable sectors
 - Coastal zones
 - Human health
 - Natural resources
- Catalog comprised of 200+ options
- Potential starting point for the consideration of adaptation options in NC

Adaptation Options - Illustrative Set of Options (Maryland)

| Option No. | Adaptation Policy Option | Flexibility | Capital intensity | Adaptive capacity | Level of consensus | Notes |
|------------|--|-------------|-------------------|-------------------|--------------------|--|
| 1 | Operation activities | | | | | |
| 1.1 | Develop operational protocols that specify disclosure requirements for coastal hazards | | | | | |
| 1.2 | Improve hazard preparedness of residential homes and commercial entities by providing operational assistance or incentives | | | | | |
| 1.3 | Assess sea level rise hazard insurance for businesses as part of standard operations | | | | | |
| 1.4 | Assess sea level rise hazard insurance for home owners in inundation hazard zones | | | | | |
| 1.5 | Implement standardized community education materials on hazards that addresses the relationship between climate variability and climate change | | | | | |
| 1.6 | Evaluate shoreline erosion buffers for zones subject to flooding in which significant infrastructure is located | | | | | |
| 1.7 | Develop and implement a tree planting program along vulnerable coastal areas as a flooding control strategy | | | | | |
| 1.8 | Prevent further development in sensitive areas subject to sea level rise hazards | | | | | <i>Noted here but recommend to move to future built environment & infrastructure adaptation option catalog</i> |
| 1.9 | Require that new development not infringe upon the sensitive shoreline areas subject to sea level rise hazards | | | | | <i>Noted here but recommend to move to future built environment & infrastructure adaptation option catalog</i> |
| 1.10 | Minimize the installation of paved surfaces as a strategy for flood runoff control | | | | | <i>Noted here but recommend to move to future built environment & infrastructure adaptation option catalog</i> |

Broad Outline of an Adaptation Process in NC

- Fact-finding (developing a vulnerability baseline – this helps establish the scope of technical working groups)
- Stakeholder process (identifying vulnerable sectors and scoping out a set of priority adaptation options)
- Recommendations (converging on a specific set of recommendations for implementation)

Potential Technical Working Groups in NC

- Coastal zones
- Water resources
- Human health
- Terrestrial ecosystems

Priority Adaptation Option Design

- Plenary Group identifies about 50 draft potential options for further development
- TWGs screen, prioritize, and propose initial policy option design (“straw proposals”)
 - Timing
 - Goals
 - Coverage
- CCS facilitates a process of evaluation and presents for review
- Plenary Group revisits list of potential priorities, as needed

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