



Memorandum

To: The Honorable Pricey Harrison, Co-Chairman
Mr. John Garrou, Co-Chairman
Members of the Legislative Commission on Global Climate Change

From: Bill Holman, Director of State Policy
Nicholas Institute for Environmental Policy Solutions

Re: Options for Planning and Adapting to Impacts of Global Climate Change
in North Carolina

Date: March 5, 2008

I am writing to respond to your request for options for state and local policy makers to consider regarding planning for and adapting to the impacts of global climate change.

Background

Concentrations of carbon dioxide in the atmosphere have increased from 277 parts per million at the dawn of the industrial revolution to 385 parts per million today and will likely rise to 450 parts per million by 2050. According to the scientists on the Intergovernmental Panel on Climate Change (IPCC) the global climate will continue to warm for a minimum of 90 more years even if the US, China and India join the rest of the developed world in capping, reducing, and offsetting emissions of greenhouse gases.

National, State and local policies to cap, reduce, and offset emissions of greenhouse gases and to stabilize the global climate should be adopted and implemented as soon as possible. However, national, State and local policies to plan for and adapt to the impacts of global climate change should also be developed, adopted and implemented as soon as possible. Unfortunately the US Department of Homeland Security's National Infrastructure Protection Plan ignores global climate change. State and local governments must begin planning for global climate change until a new Administration recognizes the problem and provides leadership and technical and financial assistance.

Impacts of Climate Change in the Southeastern United States

Global climate change has and will continue to have significant public health, environmental, and economic impacts on North Carolina. "Adaptation" to global climate change is occurring right now. The citizens of North Carolina are currently paying for beach nourishment projects, for major increases in wind and flood insurance, for bulkheads on the estuarine shoreline, and other costs.

Global climate monitoring and modeling have substantially improved over the last twenty years. Regional, State and local monitoring and modeling lag behind. The NC State

Climate Center at NC State University operates 30 ECONet climate monitoring stations in NC.

In general scientists predict more extreme weather, including longer and more severe droughts and larger storms and floods for the Southeastern United States. Warmer air should produce more rain in the Southeast, but the rain may be delivered in more intense storms that produce more runoff and less infiltration and groundwater recharge. Water supply models, stormwater controls, wastewater effluent standards, floodplain maps, etc are all based on historical weather data and may have to be reevaluated.

“Stationarity is Dead: Whither Water Management” in the February 1, 2008 issue of *Science* reports that a fundamental aspect of water resource management has been that natural systems fluctuate within certain unchanging boundaries (stationarity). The assumption of stationarity must be replaced as global warming changes the means and extremes of precipitation, evapotranspiration, and rates of discharge of rivers. *Science* reports “Rapid flow of climate-change information from the scientific realm to water managers will be critical for planning, because the information base is likely to change rapidly...”

Hotter weather increases evaporation from water supplies and stresses both crops and landscaping. It increases demands for electricity while at the same time decreases the ability of (warmer) water to cool coal and nuclear-fired power plants. Hotter weather and warmer waters could increase nuisance algae blooms and fish kills. Hotter summers could increase unhealthy levels of ozone pollution.

Over 1.2 million acres of coastal NC are below one meter (approximately 3 feet) in elevation and are particularly vulnerable to sea level rise and storm surges. Scientists estimate that sea level will rise ½ meter (1 ½ feet) or more in the next 100 years. A recent study by economists at Appalachian State, Duke, East Carolina, and University of North Carolina at Wilmington estimated that the value of property at risk to sea-level rise in just four NC coastal counties to be \$6,900,000,000.

Rising sea level will increase coastal flooding, erosion, property damage, and salt water intrusion. Saltwater will move further upstream in coastal rivers and further inland into coastal aquifers. The saltwater wedge may threaten existing freshwater intakes and supplies and may make some agricultural and forest lands unproductive.

Wetlands provide many ecological services such as water quality, flood storage, habitat, and storm protection. Wetlands may also be able to migrate with rising sea level if they are not blocked by a hardened estuarine shoreline.

Options for North Carolina Policy Makers

Inventory Existing Federal, State and Local Programs

- Many federal, state, and local agencies, including US Department of Homeland Security, Federal Emergency Management Agency (FEMA), US Army Corps of Engineers, US Department of Agriculture, US Environmental Protection Agency, NC Department of Crime Control and Public Safety (DCCPS), NC Department of Environment & Natural Resources (DENR), are “adapting” to global climate change without principles or a comprehensive plan in place.
- Inventory existing federal, state, and local disaster planning and response programs, environmental planning and management programs, and economic development planning programs, including their budgets.
- Identify conflicting policies between programs and barriers to adaptation.

Develop and Adopt Climate Adaptation Goals and Principles

- Develop and adopt climate adaptation goals and principles to guide public and private decision makers.
- Utilize the consistency provisions of the Coastal Area Management Act and federal Coastal Zone Management Act to help resolve conflicts between existing policies and programs.
- Amend GS 113A-1, State Environmental Policy Act (SEPA) to add consideration of emission of greenhouse gases, climate change, and sea level rise to issues that must be addressed in environmental documents.

Improve Climate Data and Research

- Increase ability of State and local governments to predict impacts of climate change, drought, floods, and weather by appropriating \$500,000 per year to NC State University to expand and maintain NC State Climate Monitoring Network (ECONet) from 30 sites to sites in all 100 counties.
- Make NC a national center for both climate research, adaptation, and the emerging carbon market by establishing a public-private university climate research consortium (like the successful Water Resources Research Institute (WRI)) and by appropriating \$3,000,000 to University of North Carolina system. Capitalize on existing institutions including but not limited to National Oceanic & Atmospheric Administration’s (NOAA) National Climatic Data Center in Asheville, Asheville’s Centers for Environmental & Climatic Interaction, UNC-CH’s atmospheric modeling program, Duke University’s expertise in climate/energy policy and the emerging carbon market, and the new multi-university Center for Natural Disasters, Coastal Infrastructure and Emergency Management based at UNC-CH.

Plan for Droughts and Extreme Weather

- Direct DENR and the State Water Infrastructure Commission (SWIC) to work with NC League of Municipalities, NC American Water Works Association/Water Environment Federation, the engineering community and

others to provide technical and financial assistance to public water, wastewater and stormwater systems to plan for hotter temperatures, droughts, intense storms and extreme weather and appropriate \$500,000 for this purpose.

- Amend GS 143-355, the Water Planning Act of 1989, and GS 130A-311, the NC Drinking Water Act, to standardize the definition of “Safe Yield” for water supplies, to ensure that public and private water suppliers plan for global climate change, and to enable Division of Environmental Health to consider safe yield when reviewing plans for drinking water systems. The NC Utilities Commission should also consider safe yield in its review of private water systems.
- Build upon DCCPS’s “Storm Ready” communities program and establish a “Climate Ready” communities program. Provide incentives to Climate Ready communities such as insurance premium discounts and favorable consideration for state financial and technical assistance.

Plan for Sea Level Rise and Intense Storms

- Amend GS 113A-100, Coastal Area Management Act (CAMA) to require Coastal Resources Commission (CRC), Division of Coastal Management (DCM), and local governments to consider sea level rise when approving land use plans and major CAMA permits. Authorize use of coastal management grants to local government to plan for and adapt to sea level rise.
- Increase protection of coastal wetlands and their ability to migrate inland by directing the Coastal Resources Commission (CRC) to prohibit new bulkheads and hard structures in “critical wetland protection areas” or “areas of environmental concern.” Require DCM to report to the ERC annually on the loss of coastal wetlands due to estuarine shoreline hardening and other uses. Require applicants for permits to harden the estuarine shoreline outside of areas of environmental concern to mitigate their impacts on wetlands. Direct Coastal Habitat Protection Plan (CHPP) to plan for and adapt to global climate change and sea level rise. Increase funding for Clean Water Management Trust Fund (CWMTF) in order to protect and restore coastal wetlands.
- Retain NC’s model law that recognizes that sea level is rising, beaches are moving and that prohibits new seawalls, jetties, and groins on the ocean.
- Direct the NC Albemarle/Pamlico National Estuary Program to review US Environmental Protection Agency’s proposed “Climate Ready Estuaries” program and plan for and adapt to global climate change and sea level rise in its work.
- Provide maps of sea level rise to local governments, Realtors, conservation organizations, and the public via NC One Map.
- Improve coordination or consolidate and integrate State natural hazard planning & regulatory programs in DENR and/or the Department of Crime Control & Public Safety. Review effectiveness of existing technical assistance, financial assistance, mapping, and regulatory programs in DENR and DCCPS. For example floodplain management and stormwater management programs should be complimentary. Sea level rise planning and coastal management should be complimentary. DCCPS should retain primary authority for emergency response.

Mitigate Hazards

- Establish a NC Hazard Mitigation Fund to acquire either conservation easements or fee simple properties in floodplains and other high risk areas to protect the public, prevent property damage and lower risks before sea level rises and storms occur. Fund with appropriations from the General Fund, a surcharge on property insurance, a surcharge on high risk properties, and/or fee for filling or building in high risk areas such as 100-year floodplains. Insurance costs rise or insurance becomes unavailable after storms.

Thank you for your consideration.

Please let me know if you have questions or need more information.