

RECOMMENDATIONS TO THE NORTH CAROLINA LEGISLATIVE COMMISSION ON GLOBAL CLIMATE CHANGE (NC LCGCC)

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INTRODUCTION

Climate change has been ongoing at many different scales since the origin of our planet and will continue into the future. North Carolina's coastal zone is a high energy, dynamic system that is in a constant state of flux in response to the changing climate, including sea-level fluctuation, storm frequency and intensity, amounts of precipitation (floods and droughts), etc. North Carolinians must understand and adapt to the coastal system dynamics in order to protect the integrity of the coastal resources and maximize their economic utilization without jeopardizing the long-term character of those resources. Ignoring impending climate changes will result in severe impacts to the coastal resources and catastrophic consequences to the coastal economy.

The North Carolina 2005 Session of the General Assembly passed the Global Warming/Climate Change Act (HB 1191/SB 1134) that established the Legislative Commission on Global Climate Change (NC LCGCC). The three prime objectives of this law and the NC LCGCC can be summarized as follows:

1. To better manage the human activities that are apparently impacting global climate change;
2. To take advantage of economic opportunities that may result from global climate change and the emerging carbon market; and
3. To deal with the potential consequences of global climate change on the citizens, natural resources, and economy of the state.

The past membership and agenda of the NC LCGCC is largely a result of the legislative relationship of the NC LCGCC to North Carolina's Clean Smokestacks Act of 2002 and DNER's DAQ. Consequently, much of the work of the NC LCGC Commission to date has dealt with objectives 1 and 2 above. It is now imperative that the NC LCGCC recommend that the State move forward on objective 3. Thus, I suggest the following recommendations.

RECOMMENDATION 1: NCLCGCC COMMISSION and TWO SUB-COMMISSIONS

The NC Legislature should reconstitute the present NCLCGCC as a permanent policy commission composed of legislators to evaluate and implement the reports and recommendations of two equal sub-commissions, or their equivalents, composed of technical personnel. Composition of the sub-commissions should be a broad-base of technical experts in the various aspects of the two primary topics. My recommendations will only concern the **SUB-COMMISSION ON ADAPTATION TO CLIMATE CHANGE**.

A. SUB-COMMISSION ON ECONOMICS AND ENERGY:

Economic opportunities that may result from global climate change, alternative energy sources, and the emerging carbon market (Objectives 1 and 2 above).

B. SUB-COMMISSION ON ADAPTATION TO CLIMATE CHANGE:

Consequences of global climate change resulting from rising sea level and changing storm patterns on the citizens, natural resources, and existing economy of the State (Objectives 1 and 3 above).

1. This sub-commission should be charged with developing a comprehensive State Climate Change Adaptation Plan that develops a “future vision” for coastal NC concerning the controversial economic and resource maintenance issues in the face of potential direct consequences of climate change (e.g., changes in rates and amounts of sea-level rise; frequency and intensity of storms, floods, droughts, and fires; and shoreline erosion, resulting land loss, and ecosystem changes; etc.). This vision should be based upon the projected rates of future sea-level rise for the time slices utilized in the legislative study done by the NCCRC Science Panel (2010).

2. The Adaptation Plan should begin to define and develop a preliminary set of fluid plans and recommendations concerning (but not limited to) the following aspects of adaptation to ongoing climate change in coastal NC.

- a) Identify the fundamental issues resulting from the ongoing physical processes of climate change, sea-level rise, storms, and human modification that have formed, maintained, and continue to impact the coastal environment .
- b) Begin development of plans for “geo-zoning” of the barrier islands and estuarine shore zone environments within coastal NC.
- c) Consider the pros and cons of in situ management and/or retreat from the high hazard ocean and inlet shorelines, estuarine shorelines, many present practices of ocean and estuarine shoreline maintenance

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(e.g. beach nourishment, sandbags, constructed barrier-dune ridges, etc.), and modifying barrier island infrastructure (e.g., roads and bridges; water, power, and sewer lines, etc.).

d) Determine possible cost share incentives with land owners for construction of ecologically beneficial erosion control structures on estuarine shorelines.

e) Identify new economic opportunities based upon the projected changes and resulting adaptations to the changes within the eastern NC coastal system.

f) Delineate economically viable and environmentally sound pathways forward for each of the sea-level scenarios and time slices in the NCCRC Science Panel report (2010). Prioritize recommendations based on the certainty of impact, and minimization of adverse impacts to citizens, ecosystems, and local economies.

g) Delineate mechanisms for the purchase of land or conservation easements on “at risk” portions of coastal and inlet hazard zones, as well as other portions of the low-lying coastal zone.

h) Initiate an economic cost/benefit analysis to determine the potential costs of a “status quo” alternative and of implementing recommendations proposed in the State Climate Change Adaptation Plan.

3. The Adaptation to Climate Change Sub-Commission should define a set of short-term (5-10 year), mid-term (25-50 year), and long-term (50-100 year) environmental change targets and mitigation measures that should be required if specific effects of climate change reach projected levels. These should include (but not limited to) the following.

a) Develop a set of metrics upon which the mitigation measures will be based along with a set of mandatory action policies and appropriate economic incentives to make the mitigation measures successful.

b) Develop and implement an environmental “score card” that tracks ecosystem change resulting from climatic shifts with specific focus on those resources that have direct economic priorities (e.g., agriculture, silviculture, tourism, fisheries, etc.).

c) Explore the potential for market opportunities associated with each of the mitigation measures.

4. Develop appropriate legislation to require sellers of coastal properties to disclose potential hazards to buyers. The coastal hazards disclosure should

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accompany all real estate transfers of properties within coastal counties that either are directly on ocean, inlet, or estuarine shoreline frontage or are within the 100 year flood zone.

RECOMMENDATION 2. FUND A COASTAL ADAPTATION RESOURCE MAPPING—MONITOR PROGRAM (CARMAP)

Legislation for the Coastal Adaptation Program should be a cooperative effort utilizing the extensive resources and knowledge base that resides within the various agencies of NCDNER and the UNC System. CARMAP should include the framework for mapping and inventorying the State's extensive coastal and riverine resources including the land areas within the coastal zone, the ocean and estuarine shore zones, and sub-aquatic bathymetry, sediments, and vegetation. This mapping should include (but not limited to) the following aspects.

1. Undertake a field survey and inventory of the geologic and ecologic character of the entire shoreline system and map the detailed distribution of shoreline types.
2. Carry out a field survey and inventory of the anthropogenic modifications of the entire shoreline system (e.g., hardened shoreline structures, piers, marinas, channels, etc.) and map their distribution.
3. Initiate a periodic coastal land survey (every 5 years) that incorporates high-resolution, geo-referenced, infrared aerial photography and LiDAR topography of the entire coastal zone to monitor absolute changes in shorelines, ecosystems, and land use.
4. Produce a bathymetric survey of the inland coastal waters that can be utilized for detailed modeling of estuarine storm surge, water quality, and sea-level rise, as well as supplying critical data for modeling shoreline erosion, distribution of submerged aquatic vegetation, and ecosystem migration, etc.
5. Establish the framework for multiple kinds of permanent monitoring stations within the NC coastal zone including (but not limited to) the following.
 - a) A system of estuarine and riverine stations to measure absolute changes in sea-level rise, characterize the dynamics of storm surges and tides, and monitor water flow and quality through the coastal system, etc.
 - b) Develop a series of land-based sites in different ecosystems to monitor ecological change of habitats through time (e.g., growth rates, structure and function, freshwater resources, saltwater intrusion, sedimentation and erosion rates, etc.).

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- c) Define the critical sediment sources and their depositional sinks within the NC riverine, estuarine, and barrier island systems. Develop realistic sediment budgets and monitors for sediment transport directions and rates.

RELEVANCE TO NORTH CAROLINA

Formation of the commission and two sub-commissions are particularly relevant right now since North Carolina has a series of conflicting programs moving forward simultaneously, programs that are not considering the long-term consequences of climate change, sea-level rise, and changing patterns of storm dynamics upon the North Carolina coastal system. A few of the relevant conflicting programs include the following.

1. The ongoing study by NCDWR and NCDCM of NCDNER and associated consulting firms to develop a Beach and Inlet Management Plan (BIMP) for North Carolina.
2. Proposed legislation concerning the construction of terminal groins in NC inlets to “stabilize inlets and adjacent beaches” and the ongoing legislated study on terminal groins being done by the NCCRC and M & N company.
3. Plans for construction of the Oregon Inlet bridge and maintenance of NC Highway 12 across Pea Island National Wildlife Refuge with a 50-year plan based upon a “business as usual” approach.
4. The open-door state policies of NCDCM that allow sandbagging of structures in the ocean and inlet high hazard zones and the construction of hardened structures along the estuarine shorelines.

ECONOMIC JUSTIFICATION

If NC does nothing concerning the ongoing processes of climate change and sea-level rise, the economic impact will be catastrophic to our tourism industry and the natural resources upon which it is based at the state, local, and private levels. Positive action to deal with the ongoing changes and improvement of natural resource quality will produce extremely positive results, both economically and environmentally at all levels. This new vision will not be easy to implement and will require a serious level of education and adaptation of and by the NC citizens, coastal managers, business people, and politicians.

Climate change, sea-level rise, and storms are ongoing and integral processes that dictate the composition and character of North Carolina’s coastal system. In response to these processes, well over 100 miles of ocean shoreline communities want beach nourishment sand now and forever, hundreds of sand-bagged homes and tens of miles of coastal highway are permanently or routinely in the surf zone; thousands of miles of ocean and estuarine shorelines are eroding at rates up to 15 feet/year; at least six communities are seeking hard stabilization for their adjacent and dynamic inlets; estuarine water quality continues to be a problem, coastal fishery production continues to decline and local fish houses and fishermen are shutting down; and there are increasing numbers of endangered species and ecosystems.

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NC must begin to coordinate and integrate coastal adaptation efforts into policy based upon long-range plans that recognize possible significant changes in climate, substantial rises in sea level, and major shifts in the frequency and intensity of storms in order to insure the following.

1. Preservation of the rich diversity of natural resources that characterize North Carolina and represent the basis of a strong and dynamic economy including the upland to wetland habitats, wildlife resources that are dependent upon these habitats, and the associated complex riverine-estuarine-oceanic ecosystems that characterize NC from the mountains to the coast.
2. Maintenance of viable economic components based upon the richness of NC's natural resource base that include the agricultural and forestry industries and the tourist economies that are totally dependent upon a healthy natural resource base.