OLR RESEARCH REPORT

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DRAFT CLIMATE PREPAREDNESS PLAN

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You asked a summary of the 2011 draft Climate Preparedness Plan. The plan and related documents are available at http://ctclimatechange.com/.

SUMMARY

The draft plan seeks to offer strategies to address the climate change vulnerabilities in the state identified in a 2010 report prepared by the adaptation subcommittee of the governor's Steering Committee on Climate Change. Among the plan's findings are that climate change may threaten agriculture, infrastructure, natural resources, and public health. It makes detailed recommendations in each of these areas, including recommendations on (1) best management practices; (2) research, monitoring, and education; and (3) policy, legislation, regulation, and funding. The draft plan focuses on issues that affect more than one area, such as the impact of climate change on water quality and quantity.

Among the recommended best management practices are that the state should:

1. encourage development practices that ensure water recharge (the return of water to aquifers);

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2. encourage, through incentive programs, sustainable water capture and storage by homeowners, municipalities, businesses, industries, and the agriculture sector;

3. develop water reuse guidelines for industry;

4. encourage adaptation strategies, including best management practices for natural habitat conservation, low impact development, and agricultural water use;

5. develop drinking water treatment standards that will reduce the effects of flooding;

6. identify and conserve ecosystem services vulnerable to climate change (an example of an ecosystem service is the water filtration performed by wetlands); and

7. encourage land management behaviors that support ecosystem services.

Among the recommendations in the areas of research, monitoring, and education are that the state should:

1. identify research needs and disseminate current climate change adaptation research and technical resources to the appropriate stakeholders;

2. assess current and future needs for potable water uses and infrastructure improvements to the public water system;

3. assess the impact of climate change on wastewater treatment facilities and encourage the development of facility-specific adaptation plans;

4. develop Connecticut-specific climate change projections for temperature, precipitation, and sea level rise;

5. intensify monitoring of diseases carried by animals such as mosquitoes and rats ("vectors");

6. continue to monitor health ailments caused by ozone pollution;

7. educate private landowners on how to manage their lands to minimize the risks from climate change; and

8. develop educational campaigns for climate change adaptation awareness targeted at multiple sectors.

In the areas of policy, legislation, regulation, and funding, the draft plan recommends, among other things, that the state:

1. adopt policies to encourage a viable, local agriculture market;

2. broaden water use planning to include climate change projections;

3. develop legislation to allow regulatory agencies to respond to extreme heat conditions in workplaces;

4. examine opportunities for water conservation through changes to the building code, appliance standards, and regulations;

5. apply climate change projections to future stream flow regulations; and

6. use part of the proceeds from the regional greenhouse gas initiative auction to support climate change adaptation work.

In addition to its findings and recommendations, the draft plan contains a wide range of case studies.

INTRODUCTION

The 2007 Northeast Climate Impacts Assessment found that the northeast has been warming at a rate of nearly 0.5° F per decade since 1970, with winter temperatures rising by 1.3° F per decade during this period. Most climate scientists believe that temperatures will continue to rise, sea levels will increase, and precipitation patterns will change, with increased frequency of extreme events such as downpours and blizzards as well as more frequent droughts.

PA 08-98, *An Act Concerning Connecticut Global Warming Solutions*, required the governor's Steering Committee on Climate Change to establish an adaptation subcommittee to evaluate the projected impacts of climate change on Connecticut agriculture, infrastructure, natural resources, and public health and develop strategies to mitigate these impacts. The subcommittee established four workgroups to cover each of these areas.

The subcommittee detailed the projected impacts of climate change in its 2010 report, "The Impacts of Climate Change on Connecticut

Agriculture, Infrastructure, Natural Resources and Public Health." The draft plan is a response to the requirement of PA 08-98 that the subcommittee identify how to adapt to the impacts of a changing climate in the state. For example, the report noted that water quality and quantity, ecosystem services, buildings, and transportation significantly affect each of the four areas studied.

The draft plan states that "the evidence that indicates our climate is warming dictates that preparedness planning, otherwise known as adaptation, is prudent and necessary to ensure the future viability of the built and natural environs, as well as the health and safety of the public" (p. 9). It argues that:

1. adaptation efforts offer the opportunity to provide a future vision for agriculture, more efficient infrastructure, continued natural resources conservation. and increased public health capacity,

2. planning in these areas offers an opportunity to increase Connecticut's resilience to other changes, such as increased development and demand on utilities and services; and

3. this planning can also create sustainable jobs.

AGRICULTURE

Findings

The draft plan finds that agriculture in Connecticut is likely to be highly affected by climate change, with mostly negative potential impacts. The agricultural products most likely to be threatened by climate change are maple syrup, dairy, warm weather produce, shellfish, and apple and pear production. Agriculture is affected by temperature changes and by too much or too little precipitation, which can result in decreased production yields, contamination of goods such as shellfish, and the need for costly infrastructure to compensate for these effects. On the other hand, there are some opportunities for production expansion as a result of climate change, including bio-fuel crops and grapes.

Recommendations

The draft plan argues that in order to support Connecticut agriculture and provide for economic growth and future job creation, there needs to be a vision for the future that includes strategies to reduce stress factors and to adapt to climate change, with the ultimate goal of promoting food security for the state.

Among the draft plan's recommendations are that the state:

1. continue to work with the agricultural community to create a shared vision for building resilience and sustainability in Connecticut agriculture;

2. promote the conservation of ecosystem services for Connecticut agriculture by encouraging such things as organic growing methods, no-till soil practices, crop rotation, integrated pest management, and energy and water conservation;

3. encourage new agricultural technology and infrastructure that minimizes additional greenhouse gas emissions and impacts to natural resources;

4. minimize water use across all agricultural sectors by conserving water, storing precipitation, and re-using water;

5. provide for increased research, technology transfer, and technical assistance to develop and disseminate adaptation strategies to farmers and agriculture service providers, using the state Agriculture Department and the Connecticut Agricultural Experiment Station;

6. adopt policies that encourage a viable local agriculture market by supporting the infrastructure and programs needed to grow, process, store, market, and sell local agricultural products by (a) funding and grant opportunities, (b) the repealing counterproductive land use ordinances, and (c) authorizing property tax reductions to accelerate farmland protection and expansion of agriculture operations;

7. provide public funds for agriculture infrastructure improvements needed to help Connecticut agriculture adapt to climate change, such as passive and active cooling technologies for dairy facilities; efficient irrigation systems for greenhouses, nurseries, orchards and row crops; and greenhouse cooling technologies; and

8. minimize combined sewer overflows that harm water quality in Long Island Sound and can contaminate shellfish used in aquaculture.

INFRASTRUCTURE

Findings

According to the draft plan, climate change in Connecticut may affect coastal flood control and protection, dams and levees, stormwater management, transportation, and buildings. Infrastructure would be most affected by changes in precipitation and sea level rise, which could cause substantial structural damage and require expensive mitigation technology and projects.

Information Needs

Based on its analysis of potential risk to infrastructure from climate change, the draft plan suggests the need for additional information to improve the analysis and to support further development of adaptation strategies. Among the needed information is:

1. research and detailed assessment to better understand climate change effects on infrastructure, and the ability to adapt to those changes;

2. exact locations, elevations, and valuations of public and private infrastructure to allow more accurate and useful risk assessments;

3. updated flood and sea level maps that account for the effects of climate change and the projected time frame for those effects to support better risk assessment and provide for site-specific adaptive actions; and

4. ongoing monitoring of climate conditions and sea level and associated research on climate change effects to allow for effective planning and adaptation.

Recommendations

Principles. The draft plan identifies the following principles to guide current and future planning and implementation of climate change adaptation strategies for Connecticut infrastructure:

1. climate change adaptation activities should focus on three different stages of infrastructure development: new development, redevelopment, and replacement of infrastructure, including consideration of relocation options;

2. wherever possible, infrastructure adaptation strategies should identify ancillary effects and co-benefits of climate change adaptation actions, including opportunities for climate change mitigation (e.g., reduction of greenhouse gas emissions);

3. the identification of ancillary effects and co-benefits of climate change adaptive actions on land and water management needs, regulations and programs should be incorporated into both short- and long-term planning; and

4. outreach and public engagement are important aspects of each adaptation strategy.

Planning Strategy. The draft plan identifies several components of a planning process that would maximize efficiency and completeness in the development of an infrastructure adaptation strategy. These include:

1. creating a spatial analysis of infrastructure locations, vulnerabilities, and values with regular updates to monitor and track changes over time, in order to improve planning and assessment capability;

2. using the resulting database and maps to track implementation and effectiveness of an adaptation strategy in protecting infrastructure against the effects of climate change;

3. assessing current siting, setback, and design standards and associated regulations in order to implement the regulatory and performance standards needed to address projected changes in risk to infrastructure from climate change; and

4. identifying the adaptation co-benefits provided by existing management programs and practices designed to protect environmental assets, such as low impact development that buffer or mitigate the impacts of flooding and storm surges and extreme temperatures, as well as protect natural resources, agriculture, and the public health.

Implementation. The draft plan recommends that the state:

1. develop decision tools to evaluate replacement, modification, and design life for infrastructure;

2. engage and educate private landowners to manage their lands to minimize risk from climate change;

3. conduct research to understand the effects of potential adaptation approaches and develop innovative approaches to support adaptive management; and

4. implement new or modified policies to encourage appropriate land use and reduce repetitive losses, e.g., repeatedly rebuilding structures located on flood plains.

NATURAL RESOURCES

Findings

The draft plan asserts that the natural resources most at risk from climate change are cold water streams, tidal marshes, open water marine areas, beaches and dunes, freshwater wetlands, offshore islands, major rivers, and forested swamps. These habitats are broadly distributed across Connecticut from Long Island Sound to upland watersheds and forests. The impact will vary but, likely changes include (1) conversion of rare habitat types (e.g., cold water to warm water streams, tidal marsh and offshore islands to submerged lands), (2) loss or replacement of critical species dependent on these habitats, and (3) the increased susceptibility of habitats to other threats, such as habitat fragmentation due to development and the establishment of invasive species.

In a review of over 800 Connecticut species, the natural resources workgroup identified (1) 75 species listed as endangered, threatened, or otherwise of concern to the state could experience a population decline as a result of climate change and (2) 19 invasive or potentially invasive species may experience a population increase.

Recommendations

According to the draft plan, the ultimate goal of climate adaptation for Connecticut natural resources is to reduce the risk of environmental degradation by taking steps that increase resilience. Resiliency is the ability of a well functioning habitat to accommodate climate and other types of change and return to a well functioning, if slightly altered, state. According to the draft plan, an essential part of fostering resilience to

climate change is to maintain ecosystems by reducing non-climate stresses, such as on-going habitat loss and fragmentation, wetland filling and dredging, and pollution.

Climate change adaptation strategies for natural resources will change land acquisition, ecosystem restoration, and natural resources management policies and programs. The draft plan makes near-, mid-, and long-term recommendations regarding a variety of habitats. Among other things, it recommends that the state:

1. acquire land and conservation easements to provide upslope "advancement zones" adjacent to tidal marshes;

2. perform a comprehensive assessment of the extent to which tidal marshes are moving inland to inform adaptation decisions;

3. acquire land and conservation easements in areas adjacent to coldwater streams;

4. adopt regulations that provide stream flow levels necessary to ensure the resilience and ecological integrity of coldwater streams;

5. increase active management (e.g., selective logging) of upland forests to improve regeneration, diversity, and resilience and reduce non-climate stresses to these forests;

6. reevaluate Connecticut's Green Plan and open space grant programs to prioritize acquisition of land and conservation easements for habitats most at risk from climate change;

7. collaborate with other northeast states and federal agencies to develop a coordinated regional adaptation approach for conservation of habitats and species at risk; and

8. increase connections among habitats

PUBLIC HEALTH

Findings

The draft plan determined that increases in temperature and extreme weather events, changes in precipitation, and decreases in air quality would cause more ailments related to air quality and extreme, including asthma and heat exhaustion. Changes in climate would be a threat to sanitation and food quality, and tax the resources of public health infrastructure. The draft plan also determined that existing vectors, such

as mosquitoes or ticks, may increase, and vectors that currently cannot survive the winter in Connecticut could become better able to establish and proliferate here. Both of these changes may increase unhealthy conditions and vector-associated diseases. In addition, the draft plan determined that low-income and other vulnerable communities would be disproportionately affected by these climate change impacts.

Recommendations

The draft plan finds that in order to mitigate the impacts of climate change on public health, Connecticut should:

1. consider the public health needs of vulnerable populations in climate change adaptation planning;

2. evaluate the system that alerts people when ozone levels are high to minimize respiratory health effects;

3. develop criteria for school closings during extreme heat events;

4. develop cooling station best management practices that include recommendations for equipment in cooling centers, choosing the right location to establish a center so that the target population can best access it, and effective cooling center advertising;

5. educate local health department staff on climate change impacts;

6. develop a database of morbidity and mortality caused by climate change;

7. intensify monitoring of diseases associated with vectors;

8. develop legislation to allow regulatory agencies to respond to extreme heat conditions in work places;

9. continue to support funding for adequate updates to municipal sewage infrastructure, which may be stressed by increased and more intense extreme precipitation events that could lead to more incidences of combined sewer overflows that can contaminate the state's water and aquaculture operations in Long Island Sound.

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