**TESTIMONY OF**
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**AND ENVIRONMENTAL AFFAIRS**

**BEFORE THE**
**UNITED STATES SENATE**
**COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION**

**MAY 8, 2008**

Mr. Chairman and Members of the Committee, my name is Bruce Carlisle and I am the Assistant Director for the Massachusetts Office of Coastal Zone Management. I want to thank you for the opportunity to offer testimony on the importance of predicting the effects of climate change through a national modeling strategy, and ensuring that such a strategy meets the needs of state coastal managers and local officials, who will be the ultimate decision-makers and end-users of this information. Through my fourteen years of working on coastal policy, planning, and management, I am keenly aware of the coastal climate change information needs in the Commonwealth.

My presence today is also on behalf of the Coastal States Organization (CSO), which since 1970, has represented the interests of the Governors from the 35 coastal States, Commonwealths, and Territories on federal legislative, administrative, and policy issues relating to sound coastal, Great Lakes, and ocean management. CSO and its members have been actively engaged in this issue, and in November of last year, Dr. Braxton Davis, Chair of the CSO Climate Change Work Group and Director of the Science and Policy Division at South Carolina's Office of Ocean and Coastal Resource Management, gave testimony to your committee on the importance of climate change research to state and local resource managers.

This testimony will cover climate change issues in the coastal zone, focusing on the priority modeling and information needs as conveyed by coastal zone managers around the country and highlighting the work being done in Massachusetts to build effective coastal floodplain management strategies from the ground up. Your continuing support for climate change modeling, along with the necessary research, monitoring, and computing infrastructure, is of critical and growing importance to coastal states and communities. One of the points I will emphasize is that while a national strategy for climate change modeling and assessments is necessary, to be truly effective, it must be connected to and coordinated with state, regional, and local partners.

**Background**

Throughout the Nation, our coastlines and extensive coastal floodplains play a significant role in protecting our homes and personal safety, providing recreation opportunities for all incomes, preserving our natural resources and quality of life, providing spawning grounds critical to our fishing industry, and maintaining our viable local, regional, and state economies. The coastal zone will also feel the brunt of global climate change. More than half of the Nation's population lives in coastal counties, and key economic sectors are directly linked to the coasts and oceans. Coastal counties host nearly half of the nation's jobs and generate more than half its gross domestic product.

Through the combined effects of climate change—accelerated sea level rise, more frequent and intense storms, and shifts in precipitation and temperatures—these areas will see increased flooding and shoreline erosion, changes in sediment transport, saltwater intrusion into groundwater aquifers and coastal rivers, increased harmful algal blooms, the loss of coastal wetland and coral reef habitats, and changes in population dynamics among marine and coastal species. Unless coastal decision-makers and officials start to plan for and implement effective measures to ensure coastal community resiliency, current and future development and activities—when poorly sited and/or designed—will aggravate these impacts over time.

For more than 30 years, coastal managers—like those at the Massachusetts Office of Coastal Zone Management—have been leaders in integrating coastal hazard response and proactive planning into coastal zone management. We work in close coordination with both federal agencies and local communities. Our efforts on coastal shoreline and floodplain management are extensive and include such actions as: developing critical information (e.g., high-resolution shoreline change data and coastal high-hazard zone delineation), coordinating the state's Rapid Response Storm Damage Survey Team to help spur recovery efforts, and providing hands-on technical assistance to communities as they review development projects or develop beach management plans.

**Think Globally, Act Locally**

Large-scale research, observation, and modeling are critical to improving our understanding of, and predictive capabilities for, global climate change. The 2003 National Strategic Plan for the U.S. Climate Change Science Program explains that while research focused on key and emerging climate change science areas is a high priority, directly supporting regional resource management efforts is also a critical component of the national strategy. The plan points to the development of scenarios and comparisons, the implementation and application of models, and the advancement of information supporting adaptation strategies as means of supporting decision-making at all levels. Addressing the limitations of regional- and local-scale analyses of potential climate change impacts and improving the availability of such diagnostics will greatly enhance their effectiveness in regional and local decision-making contexts. As a key "sector" and "end-user," the CSO has identified the following priority information and products to address future impacts of climate change in the coastal zone, and we urge Congress to provide support in addressing these needs:

- *Localized Sea Level Rise Scenarios* - High-resolution coastal topographic and bathymetric elevation data should be coupled with region-specific tide data, sea level rise projections, and other key input parameters to develop basic inundation models for the assessment of lands and resources most vulnerable to accelerated sea level rise. These regional models are an important first step, but coastal states will need more detailed and complex models that incorporate local, embayment-scale changes in coastal geomorphology, hydrological conditions, and human alterations and responses (e.g., seawalls and beach nourishment) to more adequately assess social, environmental, and economic vulnerabilities of climate change. Coastal states and communities would benefit from the development of uniform methods for modeling local-scale shoreline changes associated with varying sea level rise projections.

- *Storm Surge Models* - Existing models that estimate wind speeds and storm surge heights resulting from predicted storm events need to be broadened to incorporate changing storm intensities and frequencies as the result of global climate change. Again, models that

incorporate the unique configurations of local embayments or coastline morphologies, water depths, and physical features such as bridges and roads are required to develop accurate storm surge predictions and serve as effective planning tools for decisions being made today about the siting of new development and public infrastructure.

- *Impacts on Coastal Habitats and Ecosystem Services* - The integrity of many coastal habitats, such as estuarine marshes and beaches, are dependent on adequate sources of sediment supply and the accretion of sediments at certain rates. To predict changes to the these habitats and the important ecosystem services they provide—such as flood protection, wildlife habitat, and recreation—more information is needed to better understand erosion and deposition cycles and to improve our ability to predict the effects of accelerated rates of sea level rise on sediment transport, and accretion and erosion. Without sufficient vertical accretion, estuarine marshes, in particular, are extremely vulnerable to being drowned by accelerated sea level rise.

- *Ground Water and Salt Water Intrusion* - Climate change will have significant effects on local hydrologic cycles through altered precipitation, evapotranspiration, and soil moisture patterns. These changes will lead to altered groundwater recharge in watershed areas, which will change the groundwater flow to coastal regions and thus the rate of saltwater intrusion in coastal aquifers. Additional modeling on the climate change impacts to local or regional hydrological processes and coastal water resources is also needed to manage coastal water supplies and estuarine biodiversity.

In Massachusetts and many other coastal states, coastal land use decisions are all too often being made at the town and municipal level by local officials who are working with shrinking budgets and resources, and often lack technical and scientific expertise. Communities are in critical need of current information and predictions, packaged and delivered through specific, tailored guidance on how to put that information to use to make storm resilient communities a reality. Because state coastal programs provide high-quality products, services, and hands-on assistance to these constituents, they are uniquely positioned for the implementation of coastal climate change adaptation strategies.

**StormSmart Coasts**

Created by the Massachusetts Office of Coastal Zone Management, StormSmart Coasts is designed to give local decision-makers, and ultimately businesses and homeowners, the information and tools they need to protect themselves from coastal storm damage and flooding, and to prepare for sea level rise and climate change. The strategy for initially delivering the StormSmart Coasts tools includes an extensive website (*www.mass.gov/czm/stormsmart*) and a series of regional workshops. The website translates complex technical information into user-friendly guidance and regulatory models with links to the best information and data from around the nation. Complicated concepts are re-enforced through a series of short fact sheets explaining the tools and providing success stories (*see attached examples*). The next phase of delivery will be to provide targeted technical assistance for StormSmart tool implementation to a select handful of coastal communities, and then take the lessons learned from these efforts and translate and package them for use by other coastal communities within Massachusetts and nationwide.

### *A Partnership at All Levels*

Led by a Coastal Management Fellow provided by the National Oceanic and Atmospheric Administration's (NOAA) Coastal Services Center, the StormSmart Coasts program is very much a team approach. StormSmart Coasts would not have been possible without support and contributions from individuals and groups at all levels. The StormSmart Coasts program was strongly influenced by guidance and advice from an attorney specializing in floodplain and wetlands law, representatives from the national Association of State Floodplain Managers, hazard mitigation staff from our state Department of Conservation and Recreation, Federal Emergency Management Agency (FEMA) personnel, and local officials. Recognizing the value of StormSmart Coasts as a national model, the Coastal Services Center has selected Massachusetts to receive another Coastal Management Fellow starting this summer to implement StormSmart Coast strategies in specific Massachusetts coastal communities.

### *StormSmart Coasts and the Local Connection*

Throughout its development, StormSmart Coasts has benefited from extensive input and review from local officials—the key target audience for the program. By involving local officials at the earliest stages of program development, we have created tools that directly meet their needs, and packaged them in a format that they can easily understand, access, and successfully implement. Empowering local action is critical, because in the end, it is the decisions that are made locally that will determine if we can successfully adapt to climate change and be resilient to natural hazards so as to avoid such tragedies as experienced in the aftermath of Hurricane Katrina.

### *No Adverse Impact*

The StormSmart Coasts program is based around the concept of No Adverse Impact. No Adverse Impact is a set of "do no harm" principles for local communities to follow when planning, designing, or evaluating public and private development activities and storm-damage prevention measures. This approach clarifies that community leaders not only have the legal right to consider the cumulative impacts of their permitting decisions, they have the legal responsibility. No Adverse Impact tools and techniques ensure that private development, public infrastructure, and planning activities do not have direct or indirect negative consequences on the surrounding natural resource areas, private property, or other communities.

### *Applying Model Outputs to Coastal Land Use Decisions*

One of the basic building blocks of StormSmart Coasts is hazard identification and mapping. The StormSmart Coasts website explains the limitation of the current FEMA Flood Insurance Rate Maps, which are engineering estimates of the extent of the floodplain at the time of the mapping. For most communities in Massachusetts, those maps are more than 20 years old and do not include the effects of erosion or sea level rise. StormSmart Coasts strongly advises hazard mitigation planners to seek and use additional sources of data, such as storm surge, shoreline change, and inundation maps, to assess their true vulnerability to coastal storm damage. They need current and specific information, synthesized and adapted to suit their requirements to best plan for and strategically address coastal floodplain management issues, adapt to climate change issues, and reduce impacts for future generations.

The Massachusetts Office of Coastal Zone Management has extensive experience packaging technical information for use by local decision-makers. One example is our shoreline change maps, which measure and estimate the changes in the Massachusetts coastline as a result of natural erosion

and accretion, as well as relative sea level rise. These maps and all accompanying data are available on our website (*www.mass.gov/czm/hazards/shoreline_change/shorelinechangeproject.htm*) with a fact sheet explaining how to use the maps. These resources receive thousands of hits per year and are used locally to supplement information provided by outdated flood maps.

### *The Time to Act Is Now*

It is very important to emphasize that this is not a problem only for the future. In an increasing number of communities along the Massachusetts coast, erosion and flooding impacts are increasingly causing damage even during today's minor storms. And with climate change, these impacts will only grow as storms increase in frequency and intensity.

**Successful Strategies through Federal-State Partnerships**

Through the Coastal Zone Management Act amendment process, provisions should be developed to allow states and territories to develop specific coastal climate change adaptation plans and strategies. States also support increased funding for climate change activities and support legislation that would encourage NOAA and other agencies to assist the states via technical assistance, mapping, modeling, data, and forecasting products, and intergovernmental coordination. Federal activities related to coastal adaptation should be coordinated closely with states by involving coastal zone management programs early in the planning process.

There are several emerging areas where state, federal, and other partners are actively working on improved coordination and cooperation for more effective coastal and ocean management. One of these is the new Integrated Ocean Observing System (IOOS) initiative. Led by NOAA, the IOOS program seeks to integrate coastal and ocean observing capabilities, in collaboration with federal and non-federal partners, to maximize access to data and generation of information products and inform decision making. Massachusetts has been participating in both the Northeast and Mid-Atlantic Regional Coastal Ocean Observing Systems, which are comprised of diverse partners including state and federal agencies, academic institutions, and coastal and maritime interests. In both of these regions, remote observation technologies (e.g., instruments on buoys and high frequency radar) and the development of prototype products have been prioritized to address the issue area of coastal inundation. When fully operational, real-time observations on meteorological and oceanographic measurements will be integrated into interactive products such as a Gulf of Maine Storm Simulation and Prediction System.

Another example of emerging synchronization is the Northeast Regional Oceans Council (NROC). Consisting of delegates from the six New England states and ex-officio members from federal agencies, NROC was established in 2005 by resolution of the New England Governor's Association. The primary function of the council is to engage in efforts that require or benefit from regional actions to address issue areas of ocean and coastal ecosystem health, coastal hazards resiliency, ocean energy planning and management, and maritime security. By increasing communication and cooperation among regional interests, the council provides new forums for information exchange and strategic state-federal collaboration on such actions as regional climate change activities and initiatives.

Finally, the Joint Subcommittee on Ocean Science and Technology created the Interagency Working Group on Ocean and Coastal Mapping in response to recommendations of the U.S. Ocean Action Plan and the 2004 National Research Council report, *A Geospatial Framework for the Coastal*

*Zone: National Needs for Coastal Mapping and Charting.* The Interagency Working Group on Ocean and Coastal Mapping brings together federal, state, industrial, academic, and nongovernmental organizations to coordinate the best use of mapping resources and to avoid duplication of effort. One of the first tasks for this group is to develop an inventory of ocean and coastal mapping data and activities. At a recent strategic planning workshop in February 2008, highlights of federal ocean and coastal mapping activities were presented, and representatives from Massachusetts, Florida, and California provided updates of their current data collection and mapping activities, best practices, and challenges. All participants identified coordination, collaboration, and partnerships as keys to successful past and future efforts.

**Legislative Opportunities**

There are two pending bills that could assist in developing these key federal-state partnerships. Massachusetts and CSO appreciate the work of Senator Kerry and strongly support the climate change research and monitoring activities proposed in the Global Change Research Improvement Act of 2007 (S. 2307). The proposed legislation would establish a national climate service through NOAA to address weather, climate change, and climate variability affecting public safety, advancing the national interest in understanding, forecasting, responding, adapting to, and mitigating the impacts of both natural and human-induced climate change and climate variability. National level research, infrastructure, and coordinated outreach and communication mechanisms would directly support state and local policy makers by providing comprehensive national research to assist with regional adaptation and mitigation planning. Under the bill, existing federal climate change research would be coordinated and particular attention would be focused on regional and state vulnerabilities to climate change, allowing communities to utilize national data to help address adaptation and mitigation on a localized level.

Massachusetts and CSO also support the climate adaptation provisions in America's Climate Security Act of 2007 (S. 2191), particularly the specific allocation of 5% of the Emission Allowance Account to states, which can be used for specific purposes, one of which is to collect, evaluate, disseminate, and use information necessary for affected coastal communities to adapt to climate change. We are in favor of the expansion of the Adaptation Fund, funded through the emissions cap and trade program, to include coastal adaptation. These provisions recognize that coastal states and communities are on the front lines of climate change and will need federal support that is proportionate to this risk.

**The Future of a Successful Climate Modeling Partnership**

As state-level coastal managers, we can develop new tools and package available tools through programs like StormSmart Coasts. While we will always do the best we can with the information we have available, the current scarcity of regional- and local-scale, high-priority data and information is alarming. For example, to improve our understanding of current and future coastal floodplains and high-hazard zones, we need topographical information in finer resolution than the coarse 10- to 20-foot contour intervals available today. Similarly, while there are hydrodynamic models that encompass regional systems (e.g., Gulf of Maine, Massachusetts Bay), these have not been tailored to the region's complex coastline and bathymetry, which includes numerous islands and shoals, and they lack the necessary field measurements for model verification and refinement. Without adequate data or resources, state and local decision-makers cannot accurately map the existing extent of the coastal floodplain, let alone project what that floodplain will look like in the next 30 years. Given the scientific complexity and levels of funding involved, state and local

governments cannot possibly hope to fill this data gap alone. We are very pleased to know that the federal government is looking to fulfill this role, and we guarantee that if you get us the information we need, we are prepared to use it wisely. Our personal safety, ecosystems, and local and regional economies depend on it.

But data alone cannot solve the problem—this information must get into the hands of the people who can use it to make better choices about development, redevelopment, and storm-damage protection, including municipal officials, business owners, and current and future homeowners in coastal floodplain areas.

Through StormSmart Coasts, we have built the framework and have begun to work with coastal communities to implement results-oriented strategies. But ultimately, the effectiveness of those strategies is limited by the data, models, and diagnostics available—and the information generated through a strategic climate modeling approach that provides such decision-support resources as reliable estimates of sea level rise in the next few decades will be the key to future success. With this critical gap filled, local and state officials will be able to successfully implement real-world strategies to address this very real problem—creating a true partnership that maximizes the best of what all levels of government have to offer.

**Conclusion**

As you move forward, we strongly encourage you to look at how state programs like StormSmart Coasts serve as successful examples—demonstrating not only how states can fine-tune and package the data and information developed through the federal climate change programs for the local decision-makers to use in a real-world context—but also how all levels of government can work together successfully. To ensure that you continue to build a results-oriented national climate modeling strategy, we strongly encourage you to work with state coastal managers, as well as local officials, to understand our specific needs. To be effective, such a strategy must specifically answer the kind of questions asked by all coastal communities looking to implement effective coastal floodplain management—what are the current risks to my community and how will those risks change in the future. Please help us put all of the pieces together so we can respond quickly and effectively to future coastal hazards.

Thank you again for the opportunity to testify on the importance of national efforts for climate change modeling. I would be happy to respond to any questions that you may have.

fact sheet 1

stormsmart coasts

# Introduction to No Adverse Impact (NAI) Land Management in the Coastal Zone

## A legally sound way for municipalities to protect people and property

### What Is NAI?

No Adverse Impact (NAI) is a forward-thinking, fair, and legally defensible approach to coastal land management. In its broadest sense, it is a set of "do no harm" principles to follow when your community is planning, designing, or evaluating public and private development activities and storm-damage prevention measures.

Photo: Massachusetts Office of Coastal Zone Management.

*While seawalls and other structures can sometimes provide storm protection, they generally require regular expensive upkeep and often lead to other problems (including beach erosion). Marshfield, Massachusetts.*

NAI protects the rights of residents, businesses, and visitors in your community by requiring that public and private projects be designed and completed in such a way that they do not: 1) pose a threat to public safety, 2) increase flood or storm damage to public or private property, and/or 3) strain municipal budgets by raising community expenditures for storm-damage mitigation, stormwater management, emergency services, and disaster recovery efforts.

### NAI: Local and Comprehensive

Careful management of coastal floodplains is critical to protect people and property, and to reduce the financial strain on businesses, private property owners, and municipal budgets. While the Commonwealth of Massachusetts has passed regulations to help prevent storm damage, ultimately most of the authority and tremendous responsibility to manage floodplains is entrusted to local governments.

Accurately evaluating the potential effects of proposed activities can be challenging, and requires looking both on and off site, since damage often isn't confined to the parcel(s) under review. For example, the construction of a home may change stormwater flow and increase erosion (removal of sediment by water or wind) to surrounding properties. Similarly, new parking lots, roads, and buildings may redirect stormwater onto other properties instead of allowing it to be reabsorbed into the ground.

Photo: Massachusetts Office of Coastal Zone Management.

*In addition to being costly to repair, roads damaged by storms can become hazards for rescue personnel and others. This road in Rockport, Massachusetts, was destroyed by a 2007 nor'easter.*

Since each permit might be considered to set a precedent, it is critical that communities consider the potential cumulative effects of their decisions—a number of seemingly insignificant projects can collectively cause substantial damage. The NAI approach clarifies that community leaders not only have the legal right to consider the cumulative impacts of their permitting decisions, they have the legal responsibility.Increasingly, communities that permit projects that result in flooding or storm damage to other properties end up in land court. (See the StormSmart Coasts Fact Sheet 2, *No Adverse Impact and the Legal Framework of Coastal Management*). Adopting the NAI approach also gives your community the chance to clearly articulate a "do no harm" goal for all future land use.

## The NAI Approach

The Association of State Floodplain Managers (ASFPM), a national organization of professional flood hazard specialists from all levels of government, the research community, the insurance industry, and technical fields, identifies three different levels of floodplain management strategies: **Basic**, **Better**, and **NAI**.

- **BASIC:** Approaches typically used to meet minimum federal or state requirements for managing floodplains and coastal areas to minimize flood losses.
- **BETTER:** Activities that are more effective than the basic level because they: 1) are tailored to specific situations, 2) provide protection from larger floods, 3) allow for uncertainty in storm magnitude prediction, and 4) serve multiple purposes.
- **NAI:** Tools and techniques that go further than the measures defined as "better" by ensuring that private development, public infrastructure, and planning activities do not have direct or indirect negative consequences on the surrounding natural resource areas, private property, or other communities.

### A "NO DEVELOPMENT" POLICY?

**By adopting the NAI approach, your community is not saying "no" to new development, it is only clarifying that developers will be required to find solutions to the potential problems that their projects may cause. This clear and predictable approach lets businesses to do what they do best—find solutions.**

ASFPM has created seven NAI Building Blocks, which can help communities to maintain and enhance flood protection. These building blocks—hazard identification and mapping; planning; regulations and development standards; mitigation; infrastructure siting and design; emergency services; and public outreach and education—are briefly introduced in the table on the next page. For more information, see ASFPM's *Coastal NAI Handbook* at www.floods.org, or the StormSmart Coasts website at www.mass.gov/czm/stormsmart.

## NAI Building Blocks

| NAI Building Block | Basic | Better | NAI |
|---|---|---|---|
| **Hazard Identification and Mapping** | Use FEMA Flood Insurance Rate Maps for land use decisions. | Gather and use detailed coastal hazard data (e.g., historic erosion rates, actual observed extents of floodwaters) for land use decisions. | Incorporate coastal hazard data (e.g., erosion rates, vulnerability of environmentally sensitive areas, and sea-level rise rates and impacts) into community-wide planning maps and regulations. |
| **Planning** | Use land use planning and zoning through a community master plan. | Develop floodplain management plans that include stormwater management and hazard mitigation measures. Promulgate detailed guidance focusing on reducing flood damage. | Design special area management plans to: protect storm damage and flood control functions of natural resources, promote reasonable coastal-dependent economic growth, and improve protection of life and property in hazard-prone areas. |
| **Regulations and Development Standards** | Follow Federal Emergency Management Agency National Flood Insurance Program regulations. | Adopt conditions for siting new development. Regulate cumulative, substantial improvements. Revise regulatory tools for addressing erosion along shorelines including: relocation of threatened buildings, building setbacks, beach nourishment and bio-engineering, and stabilization of eroded areas. | Preserve sensitive areas through bylaws and regulations that may: establish maximum densities for development, restrict structures between the shoreline and the setback line, mandate vegetative coastal buffers rather than manmade structures (bulkheads, seawalls, or groins), minimize impervious cover, and preserve stream corridor and wetland buffers. Regulate placement of fill. |
| **Mitigation** | Use common practices, such as flood proofing existing structures. | Elevate or relocate buildings. Acquire land. Encourage non-structural methods for shoreline protection. | Stabilize shorelines with vegetation. Prohibit construction in especially damage-prone areas. Prevent filling of wetlands and other lowlands. Nourish beaches where appropriate. Protect watersheds. Monitor corrective efforts. Regulate construction of shore-protection structures. |
| **Infrastructure Siting and Design** | Respond to storm events as they occur. After a storm, rebuild/repair to previous condition. | Upgrade damaged facilities to more hazard-resistant standards. Inventory hazard risks of all public buildings. Insure buildings for all hazards (as appropriate). Identify, and if possible, relocate or protect "critical facilities." | Prohibit major public infrastructure investments in special flood hazard areas. Ensure that roads, sewer lines, and utility upgrades don't encourage development in hazard-prone areas. Zone to prohibit construction in high-hazard areas. Locate new critical facilities above 500-year floodplain. |
| **Emergency Services** | Create and use generic hazard response plan. | Create and test community-wide hazard plans that involve all local boards and departments. | Create plans to ensure that all people who want or need to be evacuated can be moved to safe shelters, and post-disaster plans that improve community flood resistance through: willing land acquisition, determining which structures are "substantially damaged," and ensuring that appropriate reconstruction meets code requirements. Establish mutual aid agreements with neighboring communities. |
| **Public Outreach and Education** | Answer questions and provide information as requested by public. | Periodically inform residents of coastal hazards, vulnerability, and mitigation techniques through public workshops, and in forums after storm recovery. | Create comprehensive education and outreach programs using expertise of state and federal agencies (when needed) to encourage community-wide proactive storm preparation. Establish coastal hazard disclosure requirements for property sales. |

## The Benefits of NAI

While NAI strategies require investment in planning and implementation, they offer real benefits for your community. NAI can . . .

- **Save money**: Less damage means lower post-storm community cleanup costs, fewer demands on public officials' limited time, and reduced strain on public resources.
- **Decrease litigation:** NAI principles have been judicially tested and courts have shown immense deference to regulations that seek to prevent harm (for an example, see the StormSmart Coasts Fact Sheet 3, *A Cape Cod Community Prevents New Residences in Floodplains*). NAI can also help your community avoid potential litigation over ineffectual flood management practices that result in future damage or loss of life. (See Fact Sheet 2, *No Adverse Impact and the Legal Framework of Coastal Management*.)
- **Reduce conflicts with property owners**: NAI doesn't say "no." It says "yes, if . . ." It is a common-sense approach that seeks to protect everyone's property by only allowing projects that eliminate or mitigate their impacts.
- **Reduce risk to people and public and private property**: Better planned and designed development and public infrastructure is less likely to cause and suffer damage. An NAI approach can help protect the beaches that are critical to many communities' economies.
- **Lower flood insurance rates:** The Community Rating System (CRS) is a Federal Emergency Management Agency (FEMA) program that decreases flood insurance rates for communities with effective hazard mitigation strategies. Many NAI strategies qualify for CRS credits. For more information see the CRS Resource Center at training.fema.gov/EMIWeb/CRS/.
- **Increase your capacity to bounce back after a storm:** Reduced storm damage means less downtime and less costly clean up for local businesses, which is especially important for small, locally owned businesses that may otherwise struggle to stay solvent during frequent or prolonged closures.
- **Clarify your land use objectives:** By adopting NAI principles, your community can articulate the overarching goals that help bring consistency and predictability to permitting.
- **Preserve quality of life:** With NAI you can help make your community safer while preserving quality of life for your citizens now and in the future. An NAI approach can help ensure that your community resources, including beaches, public parks, and other open spaces, are there to be enjoyed by future generations.

## For More Information . . .

- For more on the theory of NAI and its application in coastal areas, see the Association of State Floodplain Managers website (www.floods.org), especially their *Coastal NAI Handbook*. Also see the StormSmart Coasts website at www.mass.gov/czm/stormsmart.
- For more on the legal issues surrounding coastal management, see the StormSmart Coasts Fact Sheet 2, *No Adverse Impact and the Legal Framework of Coastal Management*.
- For an example of NAI-type regulations at work, see the StormSmart Coasts Fact Sheet 3, *A Cape Cod Community Prevents New Residences in Floodplains*.
- For a more detailed look at the legal theory behind this and similar cases involving land management in hazardous areas, see the Association of State Floodplain Managers' *No Adverse Impact Floodplain Management and the Courts* by attorneys Jon Kusler and Ed Thomas, at www.floods.org.

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This fact sheet was developed through CZM's StormSmart Coasts program, which supports community efforts to manage coastal floodplains.
For further information on StormSmart Coasts, visit www.mass.gov/czm/stormsmart.

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fact sheet 2

stormsmart coasts

# No Adverse Impact and the Legal Framework of Coastal Management

## How communities can protect people & property while minimizing lawsuits

Managing coastal floodplains is a challenging endeavor that sometimes is incorrectly thought to put local government's duty to protect people and property in direct conflict with property rights. Most local officials want to reduce the harm and costs associated with coastal storms, and recognize that unwise development can worsen the situation. Unfortunately, as our society has grown more litigious, it may seem harder for municipal governments to stay out of land court when preventing or conditioning development projects, even when there is good evidence that these projects may create problems for others. However, the No Adverse Impact (NAI) approach to land use management is an appropriate way to protect people, property, and property rights. (To learn more about NAI, see the StormSmart Coasts Fact Sheet 1, *Introduction to No Adverse Impact (NAI) Land Management in the Coastal Zone*.)

**While nothing can prevent all legal challenges, following the NAI approach can help to: 1) reduce the number of lawsuits filed against local governments, and 2) greatly increase the chances that local governments will win legal challenges to their floodplain management practices.** The legal system has long recognized that when a community acts to prevent harm, it is fulfilling a critical duty. The rights of governments to protect people and property have been well recognized by the legal system since ancient times. Courts from the Commonwealth of Massachusetts to the U.S. Supreme Court have consistently shown great deference to governments acting to prevent loss of life or property, even when protective measures restrict the use of private property. This "prevention of harm" principle is the foundation of the NAI approach. The goal of this fact sheet is to provide local officials with information on how to use the NAI tools to confidently protect people and property in a fair and effective way, while avoiding lawsuits (even those alleging takings).

**Two key points:**

1. **Communities have the legal power to manage coastal and inland floodplains.**
2. **Courts may (and often do) find that communities have the legal responsibility to do so.**

*These Sandwich homeowners proactively protected their property by planting beach grass. Vegetating dunes and banks can reduce erosion and slow floodwaters without adversely impacting other properties.*

Photo: Massachusetts Office of Coastal Zone Management.

### HOW NAI CAN HELP YOUR COMMUNITY AVOID LAWSUITS

The best way to avoid losing in court is to stay out of court. One of the strengths of the NAI approach is that its clear goal (the prevention of harm) fosters and encourages cooperation between landowners and regulators as they work together to try to find solutions to the problems associated with proposed projects. Such collaboration is a great way to stay out of land court.

When avoiding court isn't possible, following the NAI approach can greatly increase the chances that local governments will win in lawsuits arising from their floodplain management practices. The most common and historically problematical challenges that local officials face while trying to regulate use of private property are allegations of "constitutional takings."

**Takings background:** This fact sheet summarizes a complex body of law under the so-called "Takings Clause" of the Fifth Amendment to the U.S. Constitution. This summary is not

*"Not all the uses an owner may make of his property are legitimate. When regulation prohibits wrongful uses, no compensation is required."* – *The Cato Institute*

intended to be legal advice for any particular situation, and may not be relied upon as such. To determine whether a particular regulation would cause a taking, communities should consult with an attorney. Property owners file takings cases when they believe regulations violate their constitutional property rights. The legal basis for these arguments can be found in the Fifth Amendment of the U.S. Constitution, which prohibits the government from taking private property for public use without compensation. The interpretation of the courts through the years has clarified that the Fifth Amendment encompasses more than an outright physical appropriation of land. In certain situations, the courts have found that regulations may be so onerous that they effectively make the land useless to the property owner, and that this total deprivation of all beneficial uses is equivalent to physically taking the land. In such a situation, courts may require the governing body that has imposed the regulation to either compensate the landowner or repeal the regulation.

Needless to say, with local budgets strapped and coastal land values skyrocketing, it is rarely economically feasible for local governments to compensate landowners when, for example, prohibiting a house on a solid foundation in an area known to flood, or preventing the construction of a seawall to protect a home on an eroding bluff.

**NAI to the Rescue:** It is critical that management decisions respect property rights and follow general legal guidelines (see the "Legal Dos and Don'ts of Floodplain Management" text box). The courts have made it very clear that property rights have limits. For example, both Commonwealth of Massachusetts and federal laws acknowledge that property owners do not have the right to: be a nuisance, violate the property rights of others (for example, by increasing flooding or erosion on other properties), trespass, be negligent, violate reasonable surface water use and riparian laws, or violate the public trust.

### THE FOUR TYPES OF REGULATORY TAKINGS

The best way to understand how the NAI approach helps to prevent takings challenges is to look specifically at what the courts have decided may constitute a regulatory taking. In 2005, the U.S. Supreme Court ruled on a precedent-setting case (*Lingle v. Chevron*), which clearly established regulatory taking guidelines. In their unanimous decision, the Court determined that there are four ways for a regulation to be a taking. **Each way is briefly discussed below, with a non-technical explanation of how they are relevant to an NAI approach.** (For a more detailed legal explanation of these cases, see the latest edition of *No Adverse Impact Floodplain Management and the Courts*, published by the Association of State Floodplain Managers at www.floods.org.)

**1. A physical intrusion.** Governments may not, without compensation, place anything on private property against the wishes of the owner. The case discussed (*Loretto v. Teleprompter Manhattan*) involved a New York City requirement that building owners allow the cable company to install a small cable box and cables on all residential buildings. **Because the NAI approach doesn't generally promote structural solutions, this type of regulatory taking is unlikely to apply. However, if a community's NAI plan involves the placement of structures (culverts, for example) on private property, this ruling makes it clear that the community may be required to obtain the permission of the landowner or pay compensation.**

### WHY NAI IS LEGALLY SOUND

**NAI doesn't take away property rights—it protects them.** NAI prevents one person from harming another's property.

**NAI is not an arbitrary or inflexible "no" to construction.** It is a performance-based standard. It is neither pro- nor anti-development.

**Courts consistently favor public entities performing their fundamental function of protecting people.** The NAI approach can help communities create fair and legally strong regulations.

**2. A total or near-total regulatory taking.** If a regulation restricts property rights to such a degree that it eliminates all or essentially all economically viable uses of a piece of property, this may constitute a taking. The case reviewed (*Lucas v. South Carolina Coastal Council*) was filed by a landowner who was prohibited from building a home on a barrier beach. **In their opinion, the Court clearly states that regulations aimed at preventing nuisance don't constitute takings. It warns, though, that governing bodies arguing that specific regulations are designed to prevent nuisances will need to demonstrate how they are addressing similarly situated nuisances (i.e., regulations may not be**

**applied arbitrarily)**. The NAI approach can help your community to consistently articulate how potentially harmful projects are nuisances. When designing land use regulations, your community should always try to ensure that the owner retains at least some economically beneficial uses. This is both fair and helps establish the legal reasonableness of your regulations. Note that land uses that harm others are not legal or beneficial, and that beneficial uses don't necessarily include building residences or other structures, especially in hazardous areas. Where new regulations, even hazard-based regulations, could sharply decrease the market price of property, consider allowing the transfer of development rights to areas where your community would like growth to occur. To learn about transferable development rights, see www.mass.gov/envir/smart_ growth_ toolkit/pages/mod-tdr.html.

**3. A significant, but not near-total regulatory taking.** Courts hearing takings arguments should consider three factors that have "particular significance" - a) the magnitude of the economic impact, b) how severely the regulation affects "investment-backed expectations," and c) the character of the government in action. The central case discussed (*Penn Central v. City of New York*) concerned a denied expansion of Grand Central Station in New York City. **The historic preservation regulation reviewed in this case seeks to protect neighborhood character—not to prevent physical harm.** These are two very different things in the eyes of the law. The U.S. legal system sometimes requires governments to compensate landowners when property rights are compromised for community improvement, but less frequently when they prevent potential harm. **There is no property right to use or develop land in a way that harms others, *even if that use maximizes the particular site's economic potential*. There is no constitutional or legal right to a good return on investments.** Unfortunately, some people invest in land with erroneous ideas about what they are legally allowed do with it, and when forbidden to do as they wish, may argue that regulations have devalued their property. The courts have made it clear that while regulations designed to prevent harm may reduce the market value of a piece of property, they do not decrease its true value, and hence NAI-based regulations cannot trigger this aspect of a taking test. A 2005 Massachusetts Supreme Judicial Court decision upheld a coastal town's regulation prohibiting new residences in its coastal floodplain because the town successfully established that this regulation was designed to prevent harm and did not render the land valueless.

## LEGAL DOS AND DON'TS OF FLOODPLAIN MANAGEMENT

**Do** clearly relate regulations to hazard prevention.

**Do** help landowners to identify economic uses.

**Do** apply identical principles to government activities.

**Don't** neglect your duty to manage the floodplain. (A hands-off approach is the surest way to be successfully sued.)

**Don't** apply regulations inconsistently or arbitrarily.

**Don't** interfere with landowners' rights to exclude others.

**Don't** deny all economic uses. Consider the use of transferable development rights in valuable, heavlily regulated areas.

For more information, see the StormSmart Coasts Fact Sheet 3, *A Cape Cod Community Prevents New Residences in Floodplains*.

**4. Insufficient relationship between the requirement and the articulated government interest.** If a community conditions a permit, the requirements it exacts from the landowner must be related to the goals of the regulation and must be "roughly proportional" to the predicted impacts of the proposed development. In the two cases, *Nollan v. the California Coastal Commission* and *Dolan v. City of Tigard*, landowners were required to provide a public right of way as a permit condition, even though the proposed developments did not reduce public access. The NAI approach avoids this type of taking by tightly binding regulations to the specific goal of preventing harm.

With these and other decisions, the courts have made it clear that governments may regulate land without compensation if they do so with the intent of preventing harm. **Fairly applied No Adverse Impact regulations make the "takings issue" a non-issue.**

From the property rights perspective, it's worth noting that the Cato Institute, which advocates for limited government, individual liberty, and free markets, agrees that preventing landowners from causing harm to others does not constitute a taking:

> *"Owners may not use their property in ways that will injure their neighbors. Here the Court has gotten it right when it has carved out the so-called nuisance exception to the Constitution's compensation requirement. Thus, even in those cases in which regulation removes all value from the property, the owner will not receive compensation if the regulation prohibits an injurious use."*
>
> –Roger Pilon, Senior Fellow and Director
> Cato Institute (to the U.S. House of Representatives, 2/10/95)

*"The takings clause was never intended to compensate property owners for property rights they never had."*

*– Massachusetts Supreme Judicial Court*

## WHY YOU SHOULD MANAGE YOUR FLOODPLAINS

Protecting people and property is a fundamental duty of all levels of government. One of the most effective ways that local governments protect people and property is through the permitting process. Here, local officials can and should do what they can to reduce the likelihood that the development or use of property will cause harm.

Communities should also be aware that in a growing number of states, courts are favoring plaintiffs that sue local governments for permitting projects that later cause damage to property (for example, permitting the construction of roads that back-up streams and increase flooding in the community). For more information on this trend, see *No Adverse Impact Floodplain Management and the Courts* (available at www.floods.org), where the authors found that a community is vastly more likely to be successfully sued for allowing improper development that causes harm than for prohibiting it.

**The take-home lesson:** As a local official, you have been given the responsibility and the legal rights to manage coastal and inland floodplains. If you do so in a way that expressly seeks to prevent harm, the courts will support you.

## FOR MORE INFORMATION . . .

This is not and cannot be legal advice. To answer specific legal questions please see an attorney licensed in your jurisdiction. To learn more about the general legal framework of NAI-based floodplain management see:

- *No Adverse Impact Floodplain Management and the Courts* for an excellent overview of the case history of NAI at www.floods.org. While this document is designed for attorneys, it is useful for anyone working in floodplain management.
- The StormSmart Coasts Fact Sheet 3, *A Cape Cod Community Prevents New Residences in Floodplains*, which examines a community's successfully defended NAI-type bylaw.
- The *Coastal NAI Handbook* at www.floods.org.
- The NAI section of the Association of State Floodplain Managers website at www.floods.org.
- The Institute for Local Government's one-page publication, *10 Tips for Avoiding Takings Claims,* at cacities.org/index.jsp?displaytype=11&zone=ilsg&section=land&sub_sec=land_property&tert=&story=20219.
- The American Planning Association's 1995 *Policy Guide on Takings* at www.planning.org/policyguides/takings.html.
- The StormSmart Coasts website at www.mass.gov/czm/stormsmart.


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This fact sheet was developed through CZM's StormSmart Coasts program, which supports community efforts to manage coastal floodplains.
For further information on StormSmart Coasts, visit www.mass.gov/czm/stormsmart.

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fact sheet 3

stormsmart coasts

# Case Study - A Cape Cod Community Prevents New Residences in Floodplains

## Lessons learned from Chatham's legally successful conservancy districts

In a landmark 2005 ruling, the highest court in Massachusetts decisively affirmed the authority of municipalities to regulate or even prevent residential or other high-risk development in flood-prone areas without financial compensation to the property owners, so long as the regulation does not render the land entirely valueless.

The case arose from the town of Chatham's refusal to permit the construction of a new home in a flood zone because the local zoning bylaw prohibited new residential units in the town's mapped floodplains. After multiple appeals by the landowner, the Massachusetts Supreme Judicial Court ruled on July 26, 2005, that the zoning bylaw was based on reasonable public interest, and did not render the lot economically worthless. Therefore, no compensation was due. The decision was not appealed.

### THE ZONING BYLAW

Chatham's zoning bylaw designates "conservancy districts" encompassing all land in the town's 100-year floodplain as mapped in its most recent town-approved Flood Insurance Rate Maps. The goal of the bylaw is to protect people, property, and resources (see "Chatham Conservancy District Purposes" sidebar). The bylaw clearly delineates three types of activities in designated conservancy districts—permitted uses, special permit uses, and prohibited uses—examples are shown in the table below.

### Examples from Chatham's Zoning Bylaw

| Permitted uses | Special permit uses | Prohibited uses |
|---|---|---|
| Fishing, cultivation, and harvesting of shellfish (including excavation of areas for cultivation and harvesting of marine foods); various horticulture activities | Construction of certain structures, including catwalks, piers, ramps, stairs, boat shelters, tennis courts | Filling of land |
| Outdoor recreation activities, provided that related structures do not destroy beneficial character of district | Construction of structures or buildings used in conjunction with a marina or boatyard | Draining of land |
| Floats | Construction and maintenance of driveways or roadways of minimum legal length and width | Discharging of hazardous substances, treated sewage, or thermal effluent |
| Maintenance of existing raised roadways | Construction and maintenance of private boat launches and beaches | Construction of residential units or use of houseboats or barges as dwellings |
| Installation of utilities | Installation of submerged pipes or cables used for swimming pools or commercial fishing operations | Building of any structure in V and V1-30 Zones |
| Agriculture | | Construction of pipelines to carry crude oil or unprocessed natural gas |
| Government dredging of navigation channels | | Actions that destroy natural vegetation, alter existing tidal flow, or otherwise alter the character of the land |
| Construction and maintenance of town landings and public boat launching ramps; nourishment of town beaches | | Destruction of natural growth that prevents erosion or storm damage |
| Mosquito control by Cape Cod Mosquito Control Project | | Draining, damming, or relocating water courses except for aquaculture, agriculture, or flood or mosquito control |
| Maintenance of existing channels and marine facilities | | |

*"The takings clause was never intended to compensate property owners for property rights they never had."* – *Massachusetts Supreme Judicial Court*

## THE CASE

The lawsuit concerned a 1.8-acre parcel located in Chatham's mapped floodplain (and therefore, in a conservancy district). In 1998, the owner of the lot received an offer of $192,000 for the parcel, contingent upon the ability of the purchaser to obtain the permits necessary to build a home. The proposed home was to be elevated on open piles above the mapped 100-year flood elevation.

Because the lot is located within a conservancy district, the town's Zoning Board (the district permitting authority) denied the building permit application. The owner of the lot responded by filing one suit against the Selectmen and Zoning Board and another against the town's Conservation Commission (the construction would have also violated a local wetlands bylaw), each suit alleging that the bylaws violated the owner's constitutional property rights, and that the town had thereby effectively "taken" her property (for more on constitutional takings, see StormSmart Coasts Fact Sheet 2, *No Adverse Impact and the Legal Framework of Coastal Management*). A Superior Court judge combined the two suits. After a two-day trial, which included testimony on the flood history of the property, the risks and impacts of its potential development, and the difficulty in safely evacuating the area, the Superior Court found insufficient evidence to support the plaintiff's claims that the bylaws had resulted in a regulatory land taking, and upheld the town's decision.

When the plaintiff appealed the decision, the Massachusetts Appeals Court affirmed the Superior Court's decision. While acknowledging that the bylaw did severely constrict the possible uses of the lot, the Appeals Court noted that "a land-use regulation may deprive an owner of a beneficial property use—even the most beneficial such use—without rendering the regulation an unconstitutional taking." The Appeals Court further noted that:

> "As a matter of Massachusetts law, restricting residential development within the path of floodwater, the flood plain, is a direct, logical, and reasonable means of safeguarding persons and property from those hazards occasioned by a flood and advances a substantial State interest, that is, the health, safety, and welfare of the general public as well as that of its individual members."

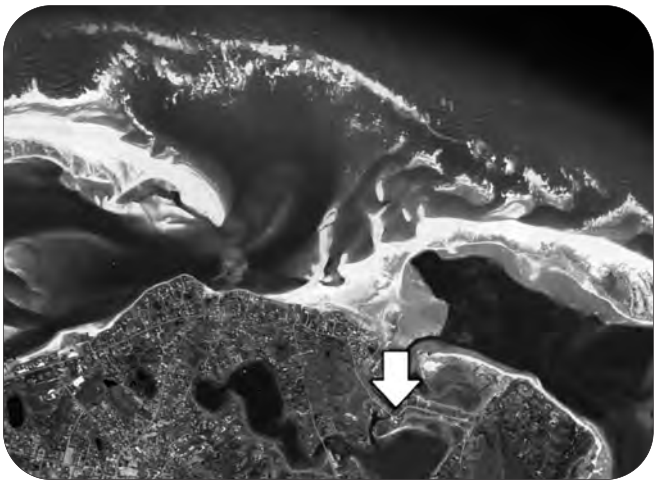

Photo: Google Earth

***The arrow indicates the approximate location of the proposed home site. This satellite photograph also shows the breach in the barrier beach from 1987. The breach greatly increased the exposure of the lot and surrounding properties to wave and storm surge.***

The plaintiff then appealed to the Massachusetts Supreme Judicial Court, which, after reviewing the case, upheld the lower courts' rulings, citing a recent U.S. Supreme Court decision that had rendered zoning bylaws and ordinances valid under the U.S. Constitution so long as their application bears a "reasonable relation to the State's legitimate purpose" (such as protecting people and property).

The decision also noted that while the regulation may have indeed reduced the market value of the property, the prevention of one potential use for a piece of property did not constitute a total taking. A witness for the plaintiff estimated that with the bylaw, the lot was worth at least $23,000—a substantial reduction but still more than a "token" interest, according to the decision which cited a (2001) case where the U.S. Supreme Court ruled that no compensation was due when a regulation reduced the appraised value of a parcel from $3,150,000 to $200,000.

Finally, the decision noted that there was ample evidence showing that the construction of a home on the lot could have severe adverse impacts on the surrounding community. The plaintiff's expert testified that the proposed house could be

*A Nauset Beach home destroyed by a 2007 storm. As was noted in the Massachusetts Supreme Judicial Court's ruling, damaged structures like the one in this photo can create debris that may threaten other structures.*

picked up off its foundation and floated away by a severe storm, potentially damaging neighboring homes. The defendant offered testimony that efforts to evacuate the home during a flood would pose risks to rescue workers, as well as the home's occupants.

The Massachusetts Supreme Judicial Court concluded that no compensation was due to the property owner, because: "The taking clause was never intended to compensate property owners for property rights they never had."

The decision was not appealed.

## WHY CHATHAM WON THE CASE

1. The zoning bylaw had the clear goals of protecting people and property.
2. While the bylaw prevents construction of new homes, it leaves property owners with many alternative uses. The land retains more than a "token" value.
3. The law was fair, and applied to identifiable, mapped areas (i.e., wasn't "spot zoning," which unfairly prevents one individual property owner from using property in a certain way).
4. The town's emergency management experts testified that evacuation of the areas would put rescue workers at risk.
5. The town was willing to legally defend its position.

*Top: The erosional beach near the proposed home site is prone to flooding and storm damage.*

*Bottom: An area of Chatham in the floodplain where flooding can make evacuation difficult.*

## FOR MORE INFORMATION . . .

- For an overview of the legal framework of coastal management in Massachusetts, see the StormSmart Coasts Fact Sheet 2, *No Adverse Impact and the Legal Framework of Coastal Management*.
- For the text of the decision, see www.socialaw.com/slip.htm?cid=15382.
- For a copy of the bylaw see www.chatham-ma.gov/Public_documents/chathamma_CommDev/Zbylaw2005.pdf.
- For a more detailed look at the legal theory behind this and similar cases involving management of land in hazardous areas, see the Association of State Floodplain Managers' *No Adverse Impact Floodplain Management and the Courts*, by attorneys Jon Kusler and Ed Thomas at www.floods.org.
- The Massachusetts StormSmart Coasts webpage: www.mass.gov/czm/stormsmart.

*As coastal areas of Massachusetts continue to change in response to erosion and storms, the relative risks to properties do too. While the risk to these homes near a new breach is obvious, homes on the mainland that were once protected by the shifting barrier island also face increased exposure. (Photo: Nauset Beach, Chatham.)*

### CHATHAM CONSERVANCY DISTRICT PURPOSES

a. Preserve and maintain the groundwater supply on which the inhabitants depend.

b. Protect the purity of coastal and inland waters for the propagation of fish and shellfish and for recreational purposes.

c. Protect public health and safety.

d. Protect persons and property from the hazards of flood and tidal waters that may result from unsuitable development in or near swamps, ponds, bogs, and marshes; along water courses; or in areas subject to flooding, extreme high tides, and the rising sea level.

e. Preserve the amenities of the town and conserve natural conditions, wildlife, and open space for the education and general welfare of the public.

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