

OVERVIEW: COASTAL HAZARDS

Adapting to Climate Change



Department
of State

Climate Change Adaptation and New York Communities

Shorelines are dynamic places. Weather systems generate wind, waves, rain, and other forces that affect shorelines. Accompanying these weather systems are environmental effects including storm surge, overwash, flooding and erosion, creating a complex array of coastal hazards wherever development occurs near the shore. Where they do not create risks to life and property, these hazards are normal and naturally occurring events. In some instances, these events can provide positive benefits to the coastal environment such as depositing sediment to build wetlands and dunes. Climate change is another hazard that communities must begin to address, especially those adjacent to the coast where sea level rise and changes in Great Lakes water levels threaten increased flooding and erosion.

New York State communities are likely to experience significant impacts to infrastructure, public health and safety, and natural resources due to climate change. The severity of these impacts and the associated costs to communities can be reduced through planning and adaptation. It is important to initiate actions early, and in coordination with current land use and capital development programs, in order to reduce the scale of the impacts from extreme events and to distribute adaptation costs over time. Understanding hazards and assessing, managing and reducing coastal risks and climate change impacts are essential elements in building community resilience.

The Department of State provides both technical assistance and grant funding to NYS communities for climate change adaptation. Funding is available for planning and implementation projects through the competitive Local Waterfront Revitalization Program's Environmental Protection Fund grant program.

Understanding Coastal Hazards

Coastal hazards are created when development (or an asset) is exposed to risk of loss or damage by natural events like storm surge, overwash, flooding and erosion. Risk will vary with topography, weather, exposure, geology, previous shore protection efforts and local conditions. In assessing waterfront flooding and erosion hazards, examine the following:

- The extent of any federally designated Flood Hazard Areas, floodways, coastal high hazard areas and Coastal Barrier Resources System units;
- The extent and nature of any State designated Coastal Erosion Hazard Areas;
- The extent of other flooding and erosion risk areas;
- The coastal processes at work on your shoreline;
- The location of natural protective features such as wetlands, dunes and bluff;
- Upland topography;
- Inland and shoreline development patterns;
- Land ownership details;



- Regional weather conditions, historic weather patterns, and predicted future weather conditions;
- Information presented in published scientific reports for your shoreline or region;
- Navigation charts and bathymetric information;
- Data on historic shoreline change and any ongoing shoreline monitoring initiatives;
- Location, extent and condition of shore protection structures;
- Records, photos and anecdotal information on past shoreline conditions and storm events; and
- Available maps and information predicting the future risk due to climate change.

Assessing Risk

Knowing the risks associated with flooding and erosion is a critical concern if you live, work, or depend on New York's coasts and waterways. Risk assessment is a method that can help identify relative levels of risk and may include factors such as the magnitude and probability of future hazardous events, exposure and vulnerability to hazards.¹ These hazards extend across wide geographic areas and impact assets in varied ways, which is why assessing risk is an important step in identification and prioritization of risk reduction measures. Since the level of development and type of hazard exposure vary by locality, and the primary land use planning tools - planning, zoning, and infrastructure investment - to manage hazards risks are locally administered, local government is often the primary forum for addressing waterfront hazards and risks.

A local government should develop a plan to address potential hazards, such as a local hazard mitigation plan and integrate hazard management into existing community plans and programs such as Local Waterfront Revitalization Programs. Work with federal and State programs that provide technical assistance to manage flooding and erosion hazards relevant to your local risk factors.

The primary questions to ask when developing plans to address shoreline hazards are:

- What are the types, frequency and scale of the hazards?
- How will the hazards change over the course of time?
- Which areas, buildings, public facilities, institutions and vulnerable populations (e.g., elderly, disabled, low income) are at risk?
- What are the risks to water-dependent uses?
- What are the risks to the transportation network?
- What is the history of past hazard impacts on identified assets?
- What is the structural condition of at-risk assets?
- What other areas are available where development might be directed as the community changes over the course of time, and may such areas become hazardous areas as the climate changes?
- What natural resources are at risk? Do they have room to move in response to climate change?
- What mitigation measures are available to reduce future hazard risk?

Managing and Minimizing Hazard Threats

Different approaches to reducing risks from coastal hazards may be appropriate according to the nature of the risk and the adjacent use. New York State law (Article 42 of the Executive Law and Article 34 of the

¹ Exposure relates to local landscape characteristics that tend to either increase or decrease hazard effects. Vulnerability is the capacity of an asset or system to return to service after an event such as a coastal storm.

Environmental Conservation Law) gives priority to nonstructural measures, including the management of development to avoid hazard areas. Nonstructural approaches maximize protection afforded by natural processes and features. These approaches offer the best opportunity for dependable long term risk reduction, require the least long term maintenance, and have the least detrimental effects on other coastal and waterfront resources and uses.

Structural measures may be the only viable option for highly developed urban areas and water-dependent uses. However, they require repeated maintenance and additional management measures, leave developed areas exposed if conditions occur that exceed structure capacity, and may have negative impacts on other resources as well as adjacent locations.

The following are examples of approaches that can be considered to reduce risk to your waterfront community from flooding and erosion and minimize the threat from coastal hazards:

- Avoid inappropriate siting of structures in hazard areas.
- Protect the natural dynamics of changing shorelines and maintain, improve, and make room for natural features and resources that protect against flooding and erosion.
- Use nonstructural measures to minimize damage to natural resources and property from flooding and erosion, including review of setbacks to ensure new buildings and accessory structures are sited outside of Flood Hazard Zones and Coastal Erosion Hazard Areas.
- Relocate existing buildings and accessory structures out of Flood Zones and Coastal Erosion Hazard Areas.
- Elevate or flood proof existing buildings and accessory structures.
- Stabilize bluff, dune, backshore and beach formations with appropriate plantings of native vegetation.
- Install conveyance structures to direct runoff away from assets (e.g., to help control water flowing over bluffs and bluff faces) and direct water to flood storage or discharge areas.
- After storm events, replace lost sediment to bluffs, dunes, backshores and beaches.
- Limit the use of hard structural erosion protection measures to protecting water dependent uses, where nonstructural approaches to reducing erosion are not effective or where enhancement of natural protective features would not provide erosion protection.
- Where hard structural measures are necessary, design in such a way to reduce impacts to coastal process and habitats (e.g., design the minimal size required to provide risk reduction benefits; include ecological enhancement of hard structures).
- Prepare and plan for post-storm response and recovery.
- Redevelop in a manner that increases community and coastal resilience.
- Develop measures to reduce damages from future storms and climate change impacts.

Resources

NYS Department of State. The Office of Planning, Development and Community Infrastructure increases the resilience and sustainable growth of New York communities and advances intentional and strategic planning, development, and protection of New York's land and water resources at the community, state, and regional level. The Office provides funding, planning assistance, as well as develops technical guidance and tools, such as Model Local Laws for Resilience and a Coastal and Riverine Risk Assessment Tool to help communities visualize and understand relative risk to community assets.

NYS Department of State Geographic Information Gateway. The Gateway is an award winning website that provides public access to data, real-time information, interactive tools, and expert knowledge relevant to NYS coastal and inland waterway resources. The focus area *Climate Change and Resilience* includes relevant

information on risk assessment, the development of coastal risk areas, and living shoreline approaches in New York State. Find the focus area at <http://opdgig.dos.ny.gov/#/focus/resilience>.

NYS Department of Environmental Conservation Erosion and Floodplain Management. Implements the state's Coastal Erosion Hazard Areas Law; serves as the State point-of-contact with the U.S. Army Corps of Engineers for shore protection; and houses the designated State Floodplain Manager; regulates activities to protect natural resources.

NYS Division of Homeland Security and Emergency Services Office of Emergency Management. Organizes disaster response, emergency preparedness and hazard mitigation for New York State; serves as the primary contact for municipalities working with the Federal Emergency Management Agency (FEMA); prepares the State Hazard Mitigation Plan; and manages FEMA grants for local All-Hazard Mitigation Plans.

National Oceanic and Atmospheric Administration. Provides technical support and scientific expertise related to current and predicted changes in climate, weather, oceans and coasts. Supports the environmental, social, and economic well being of the coast by linking people, information, and technology. Serves coastal resource managers and the state coastal programs.

Federal Emergency Management Agency. Provides federal assistance in the event of a declared coastal disaster; administers several programs to reduce hazard risk, including the Flood Mitigation Assistance Program which provides funding for preparation of Hazard Mitigation Plans; and awards Hazard Mitigation Grants, which provide partial funding to support projects that reduce potential future damages. The FEMA National Flood Insurance Program enables property owners in participating communities to purchase insurance protection against losses from flooding.

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