Pennsylvania Coastal Resiliency

Projects

Recommendations	Examples and Resources
Determine the cost of damages to neighborhoods, infrastructure, or other municipal assets from past or future storms to better prioritize which assets to protect in a future flood. Understanding the financial impact of past hazard events can also help municipalities to weigh the benefits of implementing various mitigation strategies.	*Resource*: HAZUS-MH is one source for cost estimates. It is a mapping tool that estimates the results of damage and economic loss for buildings and infrastructure from natural hazards, including flooding. The Federal Emergency Management Agency (FEMA) hosts HAZUS-MH training courses, which provide instruction on all steps of the loss estimation process, including using geographic information systems (GIS) and managing data; developing an inventory; running a loss analysis; and using the results in flooding mitigation projects and comprehensive planning, response, and recovery activities.

Acquire and conserve flood-prone properties. The most effective way to reduce losses from flooding is to acquire improved flood-prone properties, demolish or relocate any structures on them, and restrict future development on the land using a conservation easement. Repetitive loss properties that are also threatened by future sea level rise should be a priority for potential buy-outs. In cases where unimproved portions of the property are expected to be flooded, an easement rather than a fee simple acquisition may be more appropriate and more affordable for the municipality.

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Return flood-prone properties that were acquired through land conservation programs to natural floodplain conditions. As a municipality nears buildout, there are increasingly limited areas of land left that still perform natural floodplain functions. Returning lands to natural floodplain functions can be accomplished by restoring wetlands, planting natural vegetation, reducing sediment compaction, and creating a more natural elevation profile. Funding for this type of projects is often available through FEMA grant programs.	
Manage stormwater within the municipality and within the municipality's watershed. Municipal drainage systems may not be equipped to handle the combined effects of sea level rise, storm surge, and riverine flooding from storms. Low-lying coastal neighborhoods will be particularly at risk. Green stormwater infrastructure, and other stormwater best management practices (BMPs) that use living plants to treat stormwater onsite, are an excellent approach to improving stormwater management and limiting minor flooding during less severe rainfall events. When incorporated early in the design phase of a capital project, they can be less expensive than "grey" infrastructure, which includes conventional stormwater piping systems. As an added benefit, green stormwater infrastructure can help municipalities meet some requirements for the Municipal Separate Storm Sewer System (MS4) permits required by the Pennsylvania Department of Environmental Protection (PADEP). Additionally, low-lying coastal municipalities should work with municipalities in the same watershed to maximize the capture, storage, and infiltration of stormwater in upstream locations in an effort to alleviate flooding in the most vulnerable areas along the coast.	*Example*: Chester City created a green stormwater infrastructure plan to better guide the construction and use of green stormwater infrastructure techniques for managing stormwater. *Example*: The Eastern Delaware County Stormwater Collaborative is a group of municipalities within the Darby Creek watershed that meets regularly to discuss compliance with MS4 regulations and other stormwater topics.
Construct living shorelines projects. Living shorelines can be effective alternatives to "hard" shoreline protection structures, such as seawalls or bulkheads, in municipal efforts to restore, protect, and enhance the shoreline and its environment. Living shorelines use natural stabilization techniques that rely on vegetative plantings, organic materials, and sand fill. They may also involve a hybrid approach, combining vegetative plantings with low rock sills or living breakwaters to keep sediment in place and reduce the erosive impact of wave energy.	

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Collect and maintain an easily-accessible record of historic storms. Residents’ and municipal staff members’ photographs and accounts of past storms, especially ones that were not documented by state and federal agencies, are useful tools that can be used to plan for future storms. These records may identify past surge extents, conditions that caused the amplification of storm damages, and vulnerable areas not shown by mapping. These records should be included in future updates to the county’s all-hazards mitigation plan, which contains a partial history of disaster events in the county.	
Manage flooding on known contaminated sites. Many municipalities in southeastern Pennsylvania contain contaminated sites. Together with PADEP, municipalities should conduct meetings with each site owner to determine what types of contamination are located onsite, the possibility that floodwaters could carry them offsite through surface water or groundwater, and potential risks to the surrounding neighborhood. This group should then discuss how to address any major issues, including what type of cleanup may be required and who is responsible for implementation.	

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