

Growing Vulnerability

Facing Natural Hazard-Related Environmental Liability

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Hurricane Sandy Recovery Underway at South Monmouth Regional Sewerage Authority (SMRS). Credit: Michael Ruppel SMRSA

As we experienced during Hurricane Sandy, as well as other severe weather events, New Jersey is increasingly vulnerable to the effects of natural hazards. The financial losses associated with natural hazards have grown as our population and development expands in vulnerable areas. The intensity and frequency of North Atlantic hurricanes, severe winter storms, extreme precipitation events, and flooding are increasing, particularly in the Northeast United States (3rd National Climate Assessment Report). Furthermore, the ability of our communities to weather these storms has diminished because our mean sea level in New Jersey has risen a foot over the past century.

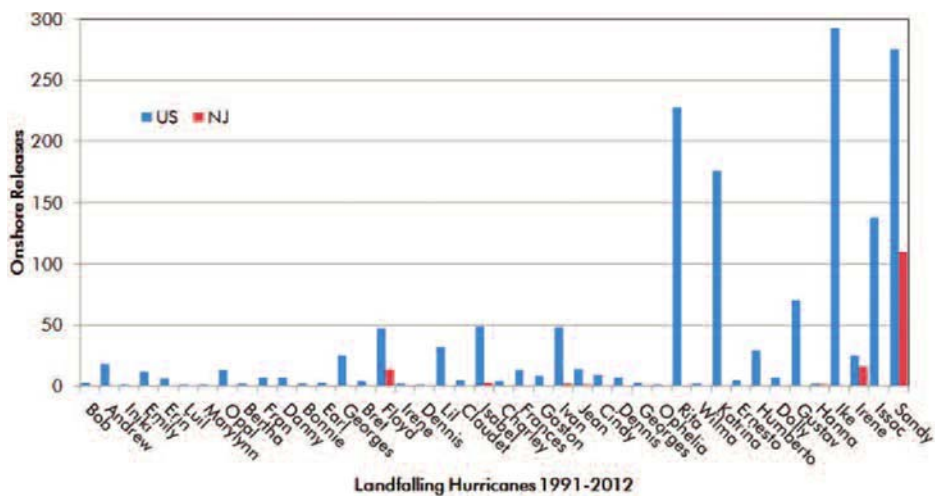
Changing climate will accelerate this trend as it is predicted that sea level will rise an additional one to four feet by 2100. This article focuses on common sense steps to reduce environmental risks in our communities and ensure they remain resilient in the future.

Environmental Risks Linked to Natural Hazards Property risk posed by extreme weather has understandably received significant attention in the wake of Hurricanes Irene and Sandy. But, these storms also dramatically illustrated that the resulting petroleum,

chemical, and sewage releases, seen in large numbers during Gulf Coast hurricanes, are a real threat in the Northeast as well.

Over 1,000 releases of petroleum and hazardous materials caused by natural hazards are reported to the federal National Response Center every year. These releases have multiplied in the last decade, primarily as a result of increased hurricane activity, sometimes with serious consequences. For example, in a single oil spill caused by flooding during Hurricane Katrina, almost 2,000 homes were impacted.

Onshore Releases Due to U.S. Hurricanes 1990-2013



On a smaller scale but with greater frequency, floods disperse many small unsecured chemical, petroleum, and propane storage vessels. Without proactive planning and mitigation, greater hurricane activity, extreme precipitation events, and sea level rise will make such releases of hazardous materials more common in New Jersey.

Controlling Municipalities' Environmental Liability Municipalities face many environmental liabilities associated with properties such as contaminated sites, water and wastewater treatment facilities, landfills, maintenance yards, and salt domes. Many municipalities have not evaluated how natural hazards

exacerbate these liabilities. The presence of natural hazard risk within a municipality is typically well known, with many resources (e.g., flood maps) readily available to evaluate risk. However, additional analysis is required to evaluate the vulnerability of specific municipally owned sites to these hazards.

Analysis can be as simple as an in-house review of hazmat storage and environmental health and safety procedures or as complex as an engineering analysis of the probability and consequences of potential accidents. Ideally, preparing for natural hazards will become integrated into normal asset management and environmental health and safety decision making.

Regardless of assessment methodology, the goal is to identify cost effective interventions to reduce environmental liability. These interventions can range from low or no cost actions like improved housekeeping or additional emergency planning to capital intensive hardening or relocation of facilities requiring external funding. Some adaptations, for example the substitution of less hazardous substances, may even result in savings on maintenance or regulatory compliance costs during normal operations.

Examples of Public Sector Action Due to infrastructure in low-lying areas and their critical public health role, wastewater authorities are highly exposed to natural hazard-induced environmental liability. As a result, they have been in the forefront of public sector efforts to assess and mitigate natural hazard-related property and environmental liability.

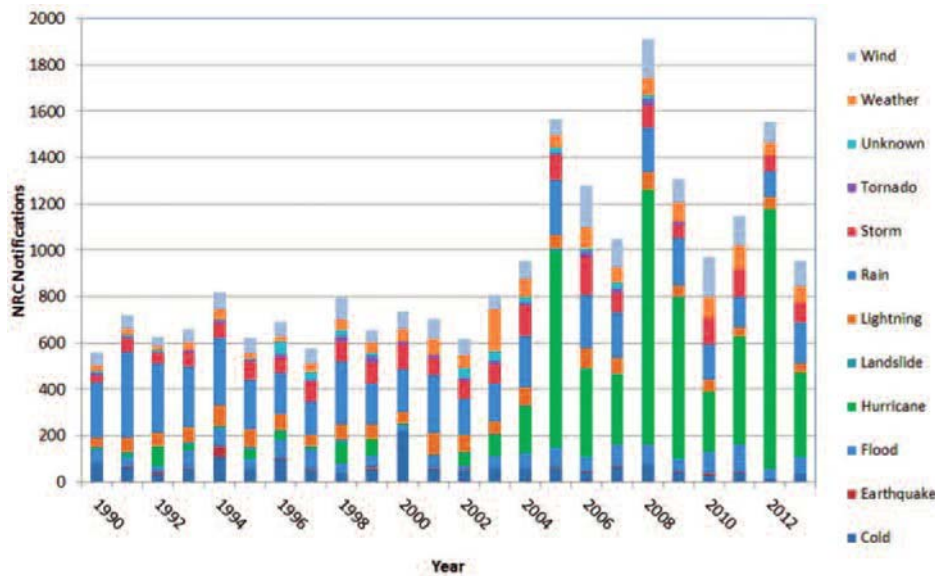
• **South Monmouth Regional Sewerage Authority** As an example, well before Hurricane Sandy, the South Monmouth Regional Sewerage Authority (SMRSA) recognized its repetitive losses and service interruptions due to coastal storms and anticipated the likely threat posed by a major hurricane. In response, they integrated extreme weather preparation into their routine asset management program.

In 2006, a vulnerable pumping station was replaced by a trailer-mounted system, which in the face of an oncoming storm could be relocated while operations continue with less expensive sacrificial systems. This pump station was the only one in the SMRSA system without a loss of service during Hurricane Sandy and use of this technology saved an estimated \$1.5 million in repair costs.

Subsequent to Hurricane Sandy, SMRSA began use of the EPA Climate Resilience Evaluation and Awareness Tool (CREAT) to assess risk to their systems and evaluate adaptation options. Based on these evaluations, an additional mobile pump station has been installed and another is being contracted, while a third facility has been hardened and a fourth relocated.

• **Linden Roselle Sewerage Authority** Likewise, the Linden Roselle Sewerage Authority (LRSA) integrated hazard

Releases Due to Natural Hazards Reported to the National Response Center 1990-2013



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mitigation into its operations. Due to experience with flooding during prior storms and close coordination with the Linden Office of Emergency Management, the severe impacts of Hurricane Sandy were anticipated.

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When the course of the storm was known, operation managers identified and implemented preparations such as installing additional sump pumps, disconnecting UV disinfection systems while activating backup disinfection, topping-off emergency fuel supplies, and deploying additional staff.

These actions, along with some good luck, allowed the treatment plant to

operate without interruption despite a five-day power outage and damages to the plant approaching a half million dollars.

Subsequent to the storm, and with the technical assistance of their insurance company and consulting engineer, additional mitigation and hardening efforts have been implemented, including elevating transformers, installing flood doors, and upgrades to control systems.

In part, due to successful management of environmental hazards in Hurricane Sandy's aftermath, the authority's environmental liability insurance has remained stable while in contrast, property insurance coverage lowered dramatically and deductibles increased substantially.

Governance of Natural Hazard-Related Environmental Risk Municipalities should also play a leadership role in reducing environmental hazards in the broader community through good governance and thoughtful implementation of emergency services. For example, based on local conditions, some municipalities choose to enact ordinances addressing fuel or hazmat storage in vulnerable areas that go beyond the requirements in The Flood Hazard Area Control Act Rules (NJAC 7:13).

The state of Delaware, which faces many of the same flooding issues as New Jersey, recently updated its model floodplain ordinances to include specific requirements on the design and restraint of above and underground storage tanks; and these requirements have been adopted by many Delaware coastal communities. Similarly, municipalities with significant natural hazard and environmental risks may adopt zoning and permitting practices which take this into consideration. For example, buffers zoning may help to protect residential areas from the hazards posed by the effect of catastrophic events on industrial or commercial operations utilizing hazardous materials.

Should a natural hazard result in hazardous environmental conditions, emergency responders at a municipal level will have initial responsibility. However, the response will be challenging when large areas are affected simultaneously and the availability of access, power, water, and communication are restricted.

Furthermore, during a natural disaster, other emergency response needs will divert resources from hazmat response. These unique challenges should be incorporated into hazmat response planning and training, particularly in regard to planning for evacuation or sheltering in place. Engaging with local industries in a cooperative fashion may be the best way to ensure that these hazards and planning needs are fully understood. Full municipal support for maintaining an active Local Emergency Planning Committee, made up of local officials, response personnel, regulated facilities, and other community stakeholders is a key way to address these needs.

A Safer, Cleaner Future Through greater awareness of how natural hazards increase environment risk, and implementing cost effective planning and mitigation, the upward trend in these types of releases can be reversed.

Effective planning and mitigation can start immediately with simple internal audits performed by educated staff followed by additional measures as circumstances permit. Taking action now will serve to reduce the risks posed by these events to municipal employees, finances, and residents now and in the future. ♻️


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