

POST-STORM CLEAN-UP & RECOVERY OPERATIONS BEST PRACTICES

In the aftermath of hurricanes, tornadoes, flash floods, Derechos, and other severe weather, many public agencies will conduct post-storm recovery and clean-up operations. Immediate recovery operations may occur on flooded streets, streets blocked by down trees and wires, and in conjunction with other agencies, such as water rescue teams from distant towns that are unfamiliar and with different operational procedures. Long-term operations typically involve vegetation and debris removal, mud clean-up, and potential exposures to hazardous material releases, carbon monoxide from temporary generators, mold, and asbestos. Let us discuss many common hazards found in post-storm clean-up and recovery operations and provide resources to increase safety for the employees involved.

Immediate Response, Rescue, and Recovery Phase

- Before beginning operations, it must be safe for responders to resume operations. Agencies should have pre-determined criteria for terminating and resuming operations. Consider such factors as wind speed and localized flooded areas.
- Know your responsibilities and lines of communication under your agency's Incident Command System (ICS). Working within the structure of the local and county ICS will ensure a safe and efficient recovery operation among the many responders. Freelancing during a post-storm environment is dangerous.
- Many severe weather events are widespread, which means lots to do and scarce initial resources. Prioritize rescues and critical infrastructure to support rescue operations. Immediate rescue and making areas safe for rescuers and residents will demand most of your attention and resources. Property conservation is a distant secondary consideration without an immediate life-safety benefit.
- Be alert for hidden dangers such as structural instability, live electrical wires, solar panels, confined spaces, and deep or moving water. Carbon monoxide is an invisible killer during this phase, as most power will be from generators or gasoline/propane appliances being used indoors. Propane tanks and other containers of hazardous materials may have broken free and moved about in the floodwaters. Raw sewage may be present.
- Don't forget the obvious dangers of dehydration, exhaustion, and heat stress. Rescuers will want to work past the point of personal safety or effectiveness. Leaders are responsible for providing rest breaks, food, and liquids for their teams.
- Damage assessment teams will need support and guidance from the Emergency Operation Center.
- Residents and business owners will need consistent and constantly updated information from local leaders.
- Drones are becoming a more common tool among responders and damage assessment teams.

Longer-term Clean-up and Recovery Phase

As the immediate rescue and scene-safety operations conclude, considerations will turn to bringing the organization and community back to normal.

- Hold at least daily briefings among operational leaders. In the early recovery phase, operations may be around the clock. 12-hour shifts are common for the first days. Twice daily shift briefings should be conducted during these times.

- The need for frequent public updates will continue. Establish a routine delivery mechanism for providing information to the public. Consider alternative mechanisms for individuals with special needs. Road closures, boil water advisories, disaster services, ice and water, and more will be critical information for the community. If local leaders do not provide timely information, misinformation will fill the void.
- Provide an ample supply of personal protective equipment (PPE) for rescuers. This can be challenging for extended operations. Conduct Job Hazard Analysis for the type and level of protective equipment needed as conditions change. Stockpile abrasion-resistant and water-resistant gloves, safety glasses, and hearing protection. Ballistic nylon or Kevlar leg protection must be worn by users of chainsaws when on the ground. Respiratory protection may be needed for mold or nuisance dust.
- For operations that must be carried out in floodwaters, assume the water is contaminated with raw sewage, bacteria, or hazardous chemicals. Evaluate alternatives to working in water. If workers must stand in water, provide adequate protection with water-impervious clothing.
- Multiple downed trees will need to be cleared to reopen roads. Prioritize primary routes. Can trees be moved/pushed off the road to facilitate recovery operations and disposed of later? Overlapping fallen trees and trees resting on houses present hazards that many public agencies do not normally handle. Analyze the situation and get assistance when needed. OSHA provides an Inspection Guidance document that is an excellent resource.
- The local energy provider will restore electrical power. Assume any downed power line is energized until confirmed as safe by the power company. Stay in contact with the local Emergency Operation Center, the municipal or county Office of Emergency Management.
 - The lack of electricity will mean the extensive use of emergency generators. Permanent generators may supply all the circuits of a building or a select few. Facility personnel should know exactly what circuits emergency generators supply as part of the facility's Lock Out / Tag Out Plan.
 - Portable generators present several risks. Carbon Monoxide will continue to be a hazard to rescuers, residents, and business owners as recovery operations continue without electricity yet restored. Residents and business owners will attempt to return to service by connecting their generators to their home and business electrical panels. Doing this incorrectly can lead to back-feeding electricity into the service side of the panel, creating a hazard for workers. Gas shortages can lead to hoarding gasoline and improper storage containers. Flammable liquid explosions and fires are a real possibility.
- Handling household, business, and public property damaged from the storm and flooding will present a significant challenge for public leaders. The regulations for routine debris management may be suspended for emergency clean-up. The New Jersey DEP may issue Emergency Debris Management rules and regulations. Communities often set up temporary debris management areas to collect items from their streets.
- Collecting tons of waterlogged, bulky, and heavy items will be another challenge for public works employees. Protect your employees from muscular-skeletal injuries by working in teams and using mechanical aids such as liftgates and backhoes when possible.
- Shelters must be supplied with food, water, and other services. At some point, the decision to close them will need to be made. Both of these functions will be complicated when the shelter houses individuals with special needs. Communities will need to coordinate with shelter managers, such as the American Red Cross.
- Domestic and farm animals will need to be cared for. Local Emergency Management officials have an Animal Annex. Unfortunately, not all animals will survive. These animals must be quickly removed and disposed of before becoming a health hazard.
- National and State officials may wish to tour the affected area. This will require additional resources to provide the needed security.
- Emotional support services for residents and responders should be made available and advertised.

Mitigation and Planning Phase

- Your agency no doubt learned things from their handling of the event. Incorporate those lessons into your plans. Update Emergency Action Plans, including:
 - Call-in lists
 - List of flood-prone areas and pre-planning warning and response operations for them
 - Update your Debris Management Plan – A template is available on the DEP [website](#).
 - Public Information Plan and Resources – The DEP provides a Clean-up Flyer for residents. The National Weather Service publishes a Turn Around Don't Drown poster and Public Service announcement on their page. The U.S. Food and Drug Administration publishes a Food and Safety Safety During Power Outages factsheet.
- Work with OEM and local grant writers to address large projects to minimize loss of life and property from the next storm.
- Ensure leaders are trained in their roles in the ICS and update their resource lists. Consider a Tabletop or Functional Exercise for practice for potential situations presented by the next storm.