

Emergency Management in Rhode Island:

A Look at the State's Level of Preparedness and Management of Resources, Communication, and Infrastructure During the March 2010 Floods



The March 2010 floods have been called a flooding event of biblical proportions. No one, not even the National Weather Service, was expecting a flood of its magnitude until only a few hours before flooding peaked.¹ The situation was ripe for chaos, miscommunication, and disaster. So how did the state of Rhode Island fare during the March 2010 floods in terms of emergency management? To what extent was Rhode Island prepared for the March 2010 floods, and to what extent is the state prepared if there were to be a major climate-related disaster today?

Based on an analysis of the timeline of events that occurred during and after the floods, as well as insights from community and state actors involved, the question of whether Rhode Island would be prepared for a similar or worse climate-related disaster today is a contentious one. While most community and state actors believe they learned a great deal from the March 2010 floods, only so much can be changed in one year, especially considering the difficulty of changing entrenched bureaucracies, private interests, and homeowners, and with such limited financial resources at a time of economic crisis. The question becomes even more pertinent, however, as regional temperatures continue to rise and storm systems are predicted to become more potent, yielding more frequent and severe flooding events in the coming years.²

This report will outline the extent to which Rhode Island was prepared for an extreme flooding event prior to the March 2010 floods. Specifically, we examine the state's use of contingency plans, protocols, and mock scenario disaster drills. Furthermore, we analyzed how these plans were used during the actual progression of events. In particular, we reviewed the state's management of resources, communication, and infrastructure throughout the duration of the flood.

Overall, our analysis of emergency management during the March 2010 floods shows that Rhode Island managed relatively well. Despite chaos and the state's lack of a concrete plan to address a flooding event of such proportions, a combination of prior planning, quick thinking, coordination among various stakeholders that began slowly and then improved, and some luck allowed Rhode Island to avert the worst. In the end, damage was limited to properties and the ecosystem since no one in the state died from the floods or even sustained serious injuries. Nonetheless, there is definite room for improvement -- had a number of minor changes been made, the state's emergency response might have been more streamlined and effective. Further, we may not be so lucky in the next disaster, be it a hurricane, severe heat wave, drought, or a flood reminiscent of March 2010.



“In Warwick, 140 police officers were on scene managing the flood for four days, often working overtime.”

Preparedness

While Rhode Island responded to the March 2010 floods quite effectively, the state, as a whole, was largely unprepared. Municipality and state agency contingency plans were inadequate for a flood of this magnitude. In the words of Steve Kass, Public Information Officer for the Rhode Island Emergency Management Agency, “There is no document for a 500-year event.”³ In fact, many municipality and state agencies did not even have contingency plans for river flooding events.⁴ Instead, many agencies, like the Rhode Island Department of Environmental Management (RIDEM), relied on protocols used for hurricanes. “Our response to the flood was like our response to a hurricane—same model—without wind and coastal impacts,” said DEM Assistant Director Terry Gray.⁵ However, even the contingency plans that were used were often left vague. Many plans designated an emergency coordinator with the authority to commit any necessary resources during an emergency, but failed to provide any additional specific direction. However, many plans did include evacuation plans and diagrams for facilities.⁶ Nonetheless, in many instances, these protocols were enough to prevent additional damage.

Things could have gone very badly. In Cranston, for example, the hazardous waste treatment facility was storing over 3,000 barrels of hazardous waste at the time of the floods, but was able to prevent an accidental release by activating its contingency plan.⁷ In essence, many municipalities and state agencies were able to make do with the contingency plans they had for other similar disasters; but as the number of severe flooding incidents are likely to increase in the future, flood-specific contingency plans will become necessary.



Furthermore, although there was a unified chain of command outlined on paper, the state's Incident Command System, which is modeled after FEMA's National Incident Management System (NIMS), did not provide enough guidance and coordination to streamline efforts between various agencies at the local, state, and federal levels. The Incident Command System is a "standardized, on-scene, all hazards incident management approach."⁸ The problem, however, is that ICS is just that—a management approach, not an exact protocol detailed with specific directions. Thus, the state's response to the March 2010 floods was progressive and reactive, rather than somewhat predetermined.⁹ However, some governmental officials noted they would be wary of a formalized protocol with specific directions for emergencies, citing the need for flexibility. "You can't have a rigid system. We've never had a situation that played out exactly as we had planned," said Steve Kass, Public Information Officer of Rhode Island Emergency Management Agency (RIEMA).¹⁰

Additionally, the state's Incident Command System is somewhat contradictory, creating the potential for a breakdown in the chain of command and miscommunication during an emergency. While the governor heads the chain of command, and RIEMA serves as the primary coordinating body, "all incidents should begin and end locally," according to NIMS.¹¹ During the floods, orders and actions seemed to originate from the bottom-up, rather than from the top-down. For example, local communities were the first to take action during the flood, while RIEMA was only allowed to provide back up for these municipalities.¹² However, there were also instances in which top-down orders did not give cities adequate time to adjust to changes (i.e. the abrupt closing of I-95 by state troopers).¹³ The muddled chain of command prompted Warwick City Planner, William Pasquale, to state, "Local, state, and federal levels of government need to be in concert."¹⁴ Because various municipalities have unique chains of command and operating procedures, the state should take on a stronger coordinating presence during disasters, ensuring one unified chain of command and a scalable set of operating procedures.



At the end of the day, numerous practice drills and scenarios performed by state and municipal agencies did allow the state to respond effectively to the floods. The state's emergency management agency conducts various scenario drills on a monthly basis in which the agency along with all of the municipal emergency management agencies, police departments, fire departments, and other first responders participate in playing out a mock disaster situation. These drills "really brought all of the state agencies together and created regional cooperation," said Steve Kass, Public Information Officer for RIEMA.¹⁵ Additionally, Assistant Director for RIDEM, Terry Gray, noted that because these drills helped various departments get to know one another, communication was easily facilitated during the floods.¹⁶ But drills were not limited to the agencies. Local hospitals also participated with RIEMA in conducting scenarios. In total, Kent County Hospital conducts monthly and sometimes even weekly drills to practice for various types and scales of emergencies.¹⁷ However, none of these scenarios had ever been geared towards a 500-year flood—mostly because, in the words of EPA Regional Contact, Justin Pim-

pare, "Absolutely no one was ever expecting this to ever happen."¹⁸ This of course, must be changed if Rhode Island is to be adequately prepared for another climate-related disaster.

Rhode Island also managed to respond to the March 2010 floods effectively despite limited financial preparedness and resources. Most of the funds for state and municipality emergency management come directly from the federal government.¹⁹ Only a few municipalities, such as the city of Warwick, had specifically allocated funds for an emergency management agency in their budgets.²⁰ In Warwick, these funds represented approximately 0.05% of the total budget and covered only the salaries of the agency's personnel.²¹ This places the state and municipalities almost at the financial mercy of the federal government and state of the economy during an emergency. Still, the lack of financial resources did not seem to affect the state's emergency response; even though financial resources might have been strained, the state was able to provide Rhode Islanders with the services of a variety of emergency personnel.



Figure 1:
Firefighters in
Rhode Island
Responding
to the Floods



Management of Resources and Personnel

Although the March 2010 floods strained the state's resources and emergency personnel, Rhode Island was able to effectively use its resources and personnel to manage the flood quite efficiently. At the local level, first responders and other personnel worked tirelessly during the floods--answering questions, directing traffic, distributing sandbags and sump pumps, repairing roads and bridges, closing off dangerous areas, and helping Rhode Islanders de-water their basements (Figure 1). In Warwick, 140 police officers were on scene managing the flood for four days, often working overtime.²² At the same time, the Warwick Sewer Authority had to bring in additional personnel from Hart Engineering to support its four mechanics, three inspectors, and two operators already on scene, and the city's Department of Public Works had over one hundred employees on call and working overtime to manage the city's highways and sanitation.²³ But not all municipalities were equipped with adequate resources and personnel. Richmond, a smaller community, did not even have full time EMA administrators, and had to rely on volunteer staff and firefighters during the flood.²⁴ In Exeter, Town Manager Robert Johnson lamented that the only gesture he could provide to the countless number of volunteer firefighters, some of whom had worked 24/7 during the flood, was a congratulatory dinner, as there is currently no FEMA reimbursement process for volunteers.²⁵

At the state level, personnel at various agencies were also exhausted during the floods. In fact, the need for addition-

al support was so crucial that nearly 17% (or 544 members) of the Rhode Island National Guard was activated to help local officials sandbag highways, coordinate local traffic control, pump out homes, and transport resources.²⁶ For many communities, the additional support was "very helpful," said Thomas Hoover, Town Manager of Coventry (Figure 2).²⁷ Meanwhile, DEM responded to 170 incidents of oil and hazardous material releases, caused mainly by heating tanks in basements filling up with water, floating to the surface, snapping, and leaking.²⁸ The agency also inspected 33 dams during the aftermath of the flood with only one individual who specializes in dam safety, placing a strain on DEM.²⁹ At the Department of Transportation, personnel "went into 24/7 mode...trying to...keep roads open," said RIDOT spokesperson Charles Martin.³⁰ Personnel at the department were busy distributing sandbags and repairing roads and bridges, but the task was not easy.³¹ "About 100 bridges and roads were closed all at once... There were 307 locations that were identified as 'flood damaged' and it took 60 different projects to fix it, and some are still in the process of being completed," said Martin.³² However, exhausted resources were not only experienced by state and municipal agencies.

At the Red Cross, the organization mobilized less than 25% (300 out of 1300) of its registered volunteer pool.³³ Many could not reach shelter sites due to the floods, but a great majority was just not engaged, said CEO of American Red Cross of Rhode Island, Bruce Rutler.³⁴ To prevent this from occurring in the future, Rutler noted his organization was holding more meetings for volunteers throughout the year

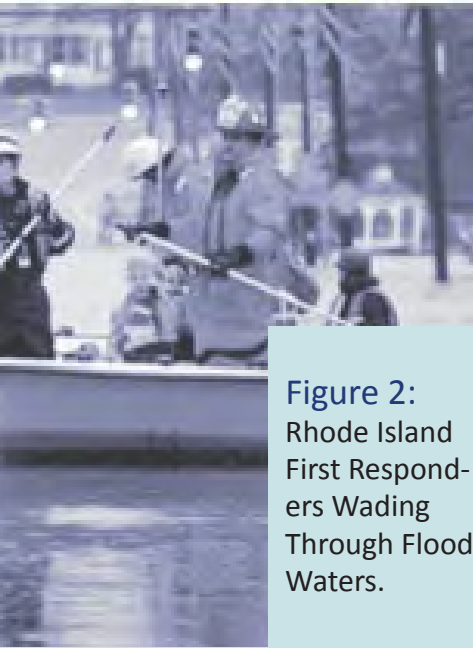


Figure 2:
Rhode Island
First Responders
Wading
Through Flood
Waters.



Figure 3:
The Rhode
Island Red
Cross Holds a
Press Confer-
ence During
the Floods

to keep them engaged.³⁵ Due to a lack of volunteers, many shelters quickly reached capacity and had to be closed while one of the state's eight shelters had to be relocated because the site of the original shelter (the senior center in West Warwick) had flooded.³⁶ Nonetheless, the organization was able to set up bulk distribution centers, providing Rhode Islanders with food, water, cots, minor medical attention, and follow-up casework.³⁷

At least one organization, however, was not stressed in terms of resources and personnel during the floods. According to Kent County Hospital Director of Public Relations, Jim Beardsworth, hospitals did not see a large influx of patients during or after the floods.³⁸ Beardsworth mainly attributed this to the fact that the floods were relatively gradual and slow approaching.³⁹ Of the patients that were admitted to the hospital, most were treated for exposure to the elements or were elderly patients with respiratory problems that could not access their home health care providers during the floods. However, Beardsworth noted that in the event of a larger emergency, the hospital would be able to handle a large influx of patients by activating alternate care sites (smaller facilities in areas like schools and gymnasiums where patients with low acuity could be treated) at the discretion of the Rhode Island Department of Health.⁴⁰

Thus, while the March 2010 floods certainly taxed many governmental agencies and volunteer organizations, Rhode Island was able to effectively manage its resources and

personnel in responding to the floods in a fairly efficient manner. Communication was also a crucial component in Rhode Island's ability to successfully manage the flooding event of March 2010.

Management of Communication

As James Thomas, Town Manager of West Warwick put it, "Constant communication was key to success in this instance."⁴¹ Indeed, Rhode Island's rapid and effective response to the March 2010 floods was a testament to the state's ability to communicate effectively with the public and among governmental agencies at federal, state and municipal levels. The state's communication with the public was quite effective. "One of the key lessons learned... was that the Reverse 911 [system] was very effective... provid[ing] ready access to disseminate information," said Scott Avedisian, Mayor of Warwick.⁴² Through Reverse 911, state and municipal officials were able to coordinate evacuation plans and send important warnings (such as the health risk posed by the collapse of wastewater treatment plants) to a large number of individuals all at once.⁴³ However, not everyone was so fortunate. Some towns such as West Warwick, did not have Reverse 911, and thus communicating with residents was "more challenging," said West Warwick's James Thomas.⁴⁴ Furthermore, while Reverse 911 was certainly effective, officials saw room for improvement. For one thing, Reverse 911 only contacts



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landline telephone numbers.⁴⁵ Thus anyone without access to a landline phone or anyone who could not reach their landline phones (i.e. businesses) could not be contacted.⁴⁶ Officials such as Terry Gray, Assistant Director for RIDEM, suggested the state incorporate more social media platforms into emergency communication, perhaps notifying residents through websites such as Twitter and Facebook.⁴⁷

In addition to using the Reverse 911 system, the state also relied on the local media. The Providence Journal covered press conferences given during the flood,⁴⁸ printed public service announcements from local city press secretaries,⁴⁹ and updated the public with the latest road closings and evacuation notices (Figure 3).⁵⁰ There were, however, instances in which communication with the public could have been improved. For example, Governor Carcieri attempted to close schools the morning of Wednesday the 31st, but the announcement did not come out until 7AM--well after the buses had started running.⁵¹

The extent to which the state was effective in communicating among various governmental agencies is a debated issue. Some officials noted that communication between various agencies operated smoothly. For Steve Kass of RIEMA, the “plan for cooperation went well.”⁵² RIEMA had equipped every first responder within the state with 800 Mhz radios and trained municipalities to use a web-based communication system called Web-EOC.⁵³ Using both of these tools, RIEMA could coordinate activities among governmental bodies and provide back-up support for towns in a timely manner.⁵⁴ Rhode Island State Police District “A”

Commander, Captain Darren Delaney, expressed similar sentiments, stating that the coordination of the emergency response in this instance was one of the best in his 23 years on the force.⁵⁵ In particular, Delaney found that collaboration between RIDOT, the National Guard, and municipal police chiefs was instrumental in managing traffic when I-95 was closed.⁵⁶ But not everyone agreed that communication was effective during the March 2010 floods.

In particular, many municipal officials found that the state police provided very little advanced warning before I-95 was shut down, creating havoc on smaller roads.⁵⁷ Mayor Avedisian of Warwick, noted that if the state police had provided adequate advanced notification, cities would have been able to place police officers to patrol smaller roads to help direct traffic.⁵⁸ Even with modern communication tools such as shared 800 Mhz radios and Web-EOC, communication still faltered at times. At the Warwick Sewer Authority, Superintendent Joel Burke requested help from RIEMA and the National Guard to evacuate the facility.⁵⁹ Instead, RIEMA sent “down a team to ‘assess’ the

situation, which didn't really help...What we really would have liked was 50 national guards with trucks. This would have been a huge help," remarked Burke.⁶⁰ However, certain agencies like municipal wastewater treatment facilities were almost completely kept out of the loop. "We really weren't part of EMS command...If we had been involved in the EMS command structure, I think that would have been a huge help...every department is supposed to be represented at the table," said Jeanine Burke, Director of the Warwick Wastewater Treatment Facility.⁶¹ Had other agencies been included in the EMS command structure, the state might have been able to respond to the floods more efficiently.

Management of Infrastructure

The tremendous inputs of water that engulfed Rhode Island during the flood placed severe burdens on infrastructure such as roads, bridges, and levees. Although the structures that were impacted by the March 2010 floods have since been largely restored to functional states, these restoration efforts required much funding and resources. As the magnitude and frequency of flooding events continue to increase with climate change, government agencies should keep in mind that responsive, rather than preventive, measures can be quite costly and inefficient.

During the floods, state and municipal actors successfully prevented casualties and serious injuries by effectively managing issues that arose from impacted infrastructure. Police departments and RIDOT were instrumental in preventing harm to drivers by closing off flood-impacted roads and bridges. Still, these road closures caused large-scale disorder and required extra personnel to maintain enforcement. James Gumbley, the chief of Cranston's Fire Department stated that they increased their minimum staffing by 25% over the course of 6 days.⁶²

The closing of I-95 created a surge in traffic that had to be redirected to smaller roads. State Police helped to alleviate traffic by opening the breakdown lanes on Route 295 for drivers.⁶³ RIDOT spokesperson, Paul Annarumo, ranked the loss of infrastructure as one of the largest challenges presented by the flood--particularly noting I-95, which had not been closed since the Blizzard of 1978.⁶⁴



Figure 4: Members of the Rhode Island National Guard Assist in Sandbagging Highways and Roads

Figure 5: Rhode Island First Responders Rescue an Elderly Woman





The flood devastated many local structures. Local and state police, RIDOT, and the National Guard cooperated to ensure that at-risk bridges were closed off to communities. City Floodplain Manager of Rhode Island Emergency Management Agency (RIEMA), Michelle Burnett, explained that bridges and other structures in West Warwick and Coventry were “completely destroyed,”⁶⁵ and RIDOT estimated that 100 bridges and roads were closed all at once during the floods.⁶⁶ RIDOT worked hard to manage issues arising from damaged infrastructure, primarily by fixing and keeping roads open, and clearing drains that were backed up on roadways (Figure 4). RIDOT’s efforts were not in vain; Rhode Island was able to re-open the interstate within a relatively short period of time.⁶⁷

One of the most debilitating effects of the flood was the submersion of wastewater treatment facilities and pump stations throughout the state. A half-dozen sewage treatment plants were impacted by the storm, and some facilities were inundated with nearly 80 million gallons of polluted water.⁶⁸ This collapse required a coordinated and rapid response effort from first responders, RIDEM, and sewage personnel.

For the duration of the flood, DEM was persistent in urging residents of impacted cities to reduce or suspend water use,⁶⁹ while the Warwick Fire Department logged over

3,000 phone calls asking for help in pumping effluent out of residential homes.⁷⁰ City officials did everything they could to quickly address the problem, even bringing in diesel-powered equipment from other states to provide short-term relief for plants that could not operate due to water-logged electronics.⁷¹ Overall, state and municipal agencies responded quickly and efficiently to problems arising from damaged infrastructure. However, while the response efforts were able to contain the spread of wastewater and prevent acute public health concerns, there is no guarantee that the situation would not repeat itself during another flood.

Much of the problem stems from the fact that the state’s infrastructure is currently designed for 100-year storms. For example, the location of wastewater treatment facilities were determined around the 100-year floodplain, because in the words of RIDEM water officials, Elizabeth Scott and Russ Chateauneuf, “[In the past], it was not considered appropriate to design past 100 year floods.” Scott and Chateauneuf added, “At this point...I wonder...do we need to look at something other than a 100-year storm to design for?”⁷²

Designing plans around a 100-year flood turned out to be insufficient. “These pump stations failed during the March 2010 floods, and the sewer authority had to purchase five large portable pumps to keep up capacity,” said Joel



Burke, Superintendent of the Warwick Sewer Authority.⁷³ In fact, levees in Warwick were built three feet higher than the standard for a 100-year flood, but even so, the river reached three feet above these levees during the floods.⁷⁴ This highlights the necessity of including higher levels of protection in future mitigation plans. Mayor Avedisian notes that Warwick is improving the levees at the Sewer Authority and animal shelter complex.⁷⁵ Similarly, Cranston has applied for grant money to flood proof critical infrastructure such as sewer pumping stations. Cranston is also constructing a flood wall on Fletcher Ave.⁷⁶ In the context of changing storm patterns, it might become necessary to redefine the parameters of the “100 year storm”.

Steps have already been made in this direction. DEM and the Coastal Resources Management Council (CRMC) has created a new storm water manual that incorporates updated values for current precipitation data and probabilities, placing the 100-year storm at over 8 inches of precipitation.⁷⁷ Elizabeth Scott and Russ Chateaufneuf of RIDEM explained, “A marked change in the last 15 years has affected the averages.”⁷⁸ Effective January 1, 2011, the new manual will guide state decisions in constructing new infrastructure like basins and levees.⁷⁹ Additionally, the state’s 2008 Hazard Mitigation Plan notes that “the density of at-risk development in some areas combined with the high value of existing mitigation infrastructure at times

makes it more cost-effective to upgrade existing structure to provided added levels of protection.”⁸⁰ As the standards for storm frequency volumes continue to rise, upgrading existing infrastructure will become increasingly cost-effective and necessary.

Conclusion

Ultimately, given the immensity of the March 2010 floods, the state of Rhode Island pulled through in managing the emergency successfully. No one died. State and municipal agencies were able to modify their contingency plans written for other natural disasters such as hurricanes, to inform their decision-making during an extreme rainstorm. Communication tools such as 800 Mhz radios and Web-EOC allowed emergency responders to coordinate their efforts. Dedicated workers and volunteers worked overtime to ensure that the worst calamities were handled. Coordination across federal, state, and local levels kept traffic away from impacted infrastructure, and officials successfully alerted the public about public health concerns related to drinking water contamination and exposure to sewage in floodwaters, thereby preventing any deaths or serious injuries caused by the flood.

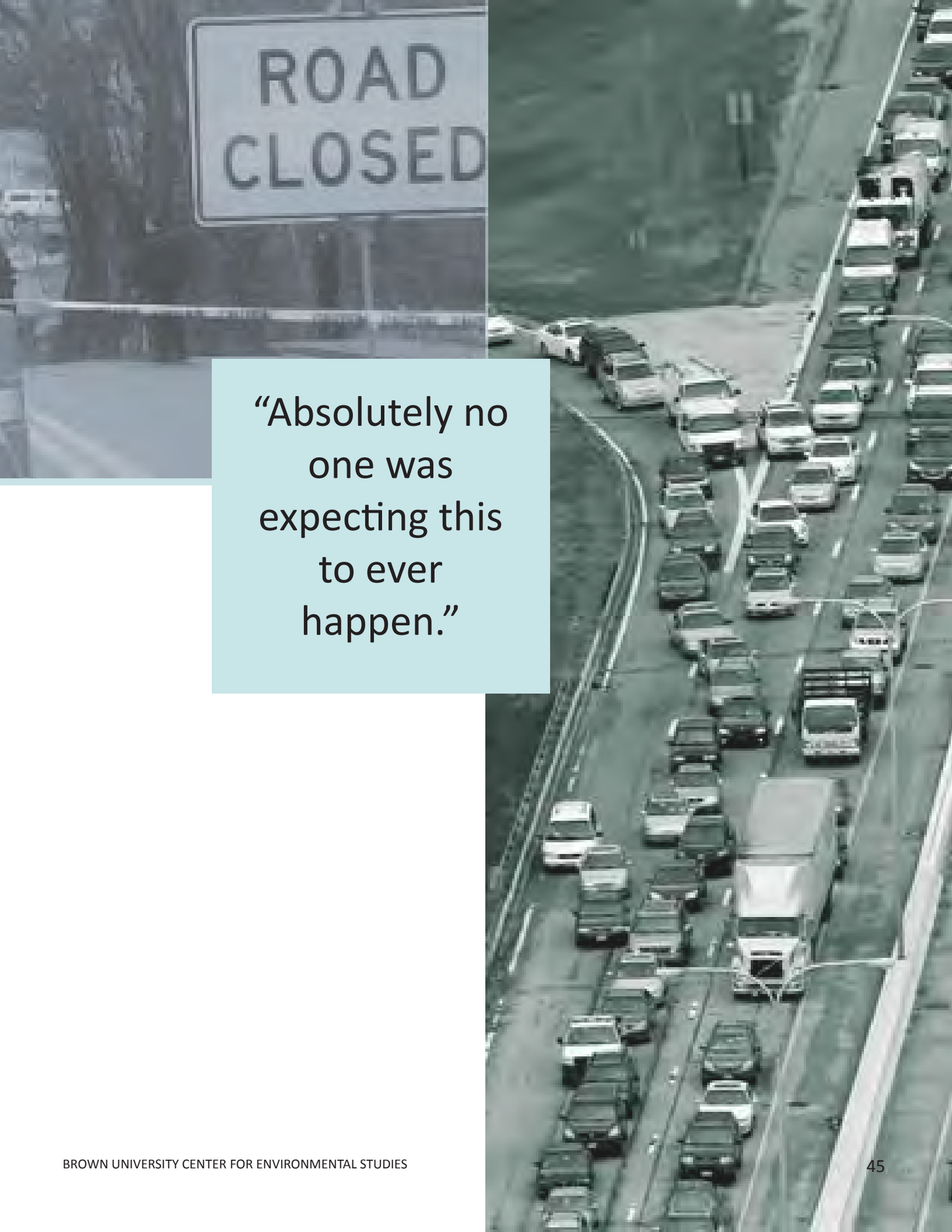


All in all, the state's successes can be largely attributed to rapid dissemination of information, effective communication, dedicated personnel, and quick decision making that bordered on ad-hoc improvisation (Figure 5). However, these improvisational measures may not prove adequate for a larger-scale natural disaster. As precipitation events grow in frequency and magnitude, governments and agencies must also step up their contingency planning, their modes of coordination, and their infrastructure standards. Contingency protocols and evacuation drills specific to flooding will better prepare Rhode Island for massive flood events. Along with these protocols, stronger communication across different levels and sectors will allow for a more coordinated response. For instance, emergency plans should be scalable across all levels of government, and should outline a clear chain of command. At the same time, they cannot be so rigid as to introduce bureaucratic obstacles and preclude the flexibility that largely contributed to successful responses in the March 2010 floods.

In addition, infrastructure should be held to higher standards, as storms will increase in magnitude with future climate change. Much of Rhode Island's current infrastructure would benefit from serious revamping. For instance, the American Society of Civil Engineer's infrastructure report card found that 57% of Rhode Island's bridges are

"structurally deficient or functionally obsolete", that 95 dams in Rhode Island are considered high hazard (i.e., would cause loss of life or significant property damage in the event of a dam failure), and that 37% of Rhode Island's major roadways are congested.⁸¹ These flaws in infrastructure may prove disastrous in a flooding event more serious than that of March 2010. The state's new storm water manual has the potential to successfully reform infrastructure design.

Ultimately, most of the groundwork for improvement is already there. Now it is a matter of fine-tuning and streamlining. As Jeanine Burke, Director of the Warwick Wastewater Treatment Facility put it, despite the state's effective management of the March 2010 floods, small changes in the state's emergency response could have made a difference: "The existing systems in place could definitely work—we don't have to reinvent the wheel."⁸²



ROAD
CLOSED

“Absolutely no
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