

Lessons Learned from Irene:

Vermont RPCs Address Transportation System Recovery





Introduction

One week after moving into the Caribbean and then striking the U.S. east coast as a category 1 hurricane, Irene arrived in Vermont on August 27, 2011.¹ The storm caused widespread damage in 223 of the state's 251 towns and villages.² Severe flooding was particularly devastating for transportation infrastructure, requiring the Vermont Agency of Transportation (VTrans) to take a leading role in the recovery. The extent of the damage, however, proved too much for a single agency to manage alone. VTrans' leadership sought help from the state's 11 regional planning commissions (RPCs) to assume responsibility for assessing needed local road repairs.

While the RPCs were well positioned to assist because of their established relationships and networks within the towns, their recovery activities often went beyond their typical scope of work. The collaboration between VTrans and the RPCs offers lessons for disaster preparedness and recovery, both crucial elements for building more resilient communities.

VERMONT

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Cover photos courtesy of Two Rivers-Ottawaquechee RC, Southern Windsor County RPC, and Town of Weathersfield, VT.

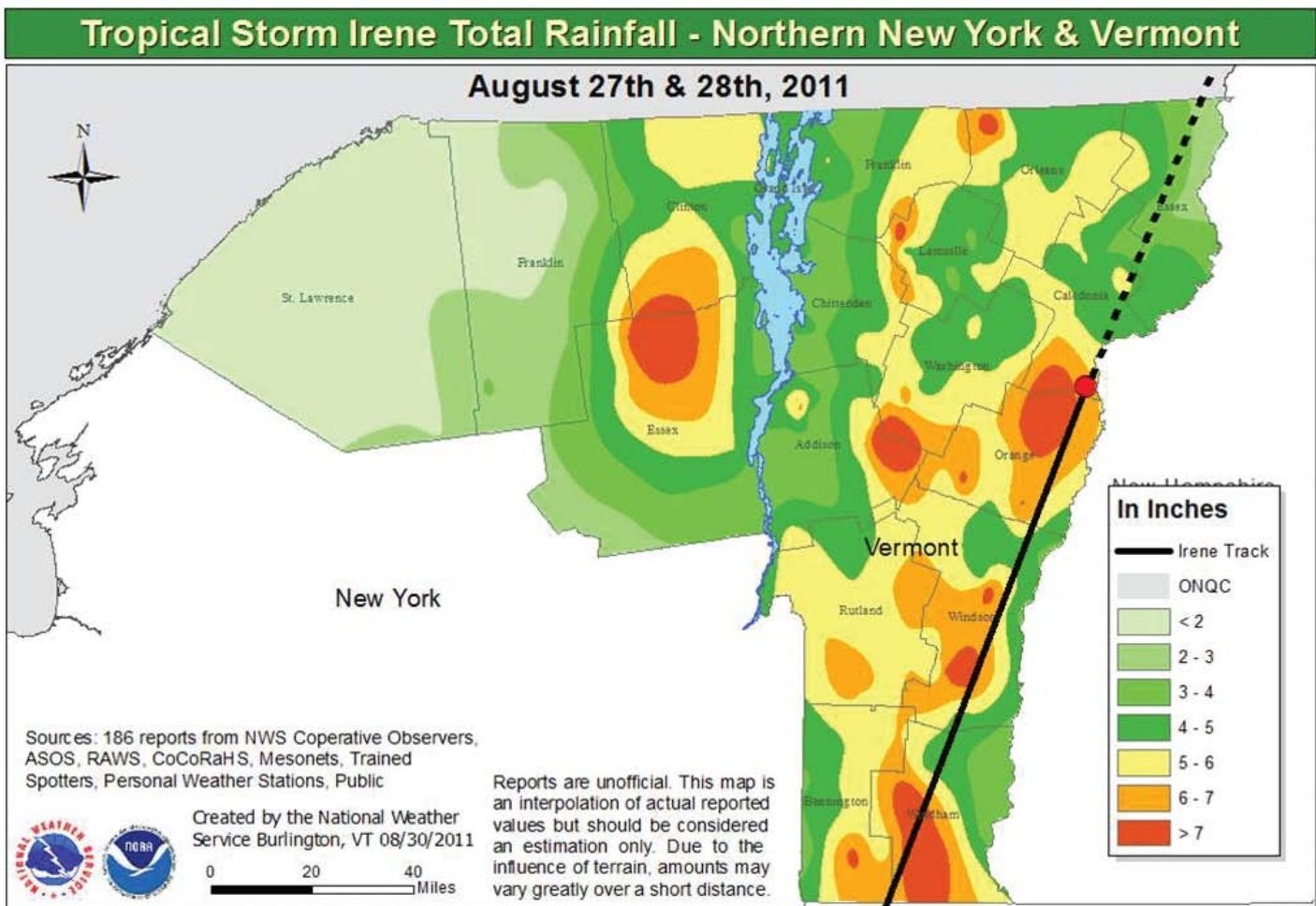
Irene's Impact

Although it had been downgraded from a hurricane to a tropical storm before making its final landfall in New England, Irene dropped up to eight inches of rain in parts of Vermont, contributing to the worst natural disaster in the state since severe flooding in 1927.³ Record-setting snow and rain earlier in the year had already saturated the ground, exacerbating the storm's effects. Governor Peter Shumlin declared an emergency the day before Irene's arrival, and President Obama signed a disaster declaration for the entire state after its passing.

According to Pam Brangan, senior planner for the Chittenden County RPC, "The magnitude of the problem started to become clear as the last flood waters receded.

The 260 road closures [as estimated by VTrans the day after the storm] would prove to be a very low estimate."⁴ Irene impacted buildings and infrastructure across Vermont, causing damage to:⁵

- 3,500 homes and 500 mobile homes
- 629 historical and cultural sites
- 20,000 acres of farmland
- 220 businesses (reported)
- Over 500 miles of state highways and 34 bridges
- Over 2,000 town road segments, 963 culverts, and 277 bridges
- 14 covered bridges, one of which was destroyed⁶
- 5 state-owned railroad bridges⁷



Map created by National Weather Service, Burlington, VT

State's Response

The state government effectively sprang into action, even as many offices, including the Emergency Operations Center in Waterbury, were flooded and needed to be relocated. Other agencies also participated in the recovery effort, such as the American Red Cross, which opened 11 shelters across the state for 280 people,⁸ the Federal Emergency Management Agency (FEMA), and the National Guard. Governor Shumlin responded to the damage and the necessary recovery efforts, saying about covered bridges: “When you see the number [of bridges] that went down rivers and streams in this storm you know that water levels were higher than what Vermont has ever experienced. So this is new territory for all of us but we’re going to keep Vermont Vermont, and that means putting covered bridges back.”⁹ The recovery, of course, was far more extensive than repairing covered bridges and required a considerable mobilization of resources.

As of late September 2011, costs to repair the state’s transportation system were estimated to be \$700 million.¹⁰ The source of this funding was the topic of debate as federal lawmakers struggled to agree on levels of as-



Photo courtesy of Southern Windsor County RPC

Fourteen of the state’s iconic covered bridges were damaged in the flooding that occurred as a result of Irene. This bridge, carried by floodwaters into a field, and twelve others were able to be repaired.

sistance. One month later, the figure was revised down to \$100 – 250 million, greatly reducing the burden on the state’s finances and avoiding the need to raise additional tax revenue.¹¹ Expedited procedures helped achieve the savings, as Vermont Deputy Secretary of Transportation Sue Minter explained: “When we are in an emergency, we don’t have to take on all of the normal construction



Photo courtesy of VTrans



Photo courtesy of VTrans

processes. Those extend from permitting at the federal and state [levels], to community outreach, to surveying, to negotiation and compensation for right of way.”¹²

Temporarily reducing regulations saved not only money, but also time, as working hour rules were waived and contractors were allowed to extract gravel from streams.¹³ In addition, administrators implemented an accelerated process for obtaining stream alteration permits, meaning that engineers could spend more time on-site at impacted streams and other waterways.

Governor Shumlin’s first directive to VTrans was to reconnect 13 communities that were completely shut off from the state road system.¹⁴ Minter coordinated the agency’s recovery work and responded to this and other priorities, such as giving access to utility companies to restore power to the 50,000 who lost it. Establishing an east-west route across the state was also key, since only north-south travel was possible on the state’s major road network immediately after the storm.

Members of the VTrans recovery team, recognizing the magnitude of the challenge and the limits of a single agency, approached Minter with their concerns about VTrans’ ability to meet its mission. She spoke with Lieutenant Governor Phil Scott about deploying the RPCs to establish an incident command system and take over as the link to the towns. A VTrans memorandum from September 7 outlined the RPCs’ “major responsibilities associated with the coordination of assisting municipalities with the resources they need for the reconstruction of local roads below the major collector level,” allowing VTrans to focus on state and federal highways.¹⁵ After this announcement, the RPCs took on new and critical roles.

Regional Planning Commissions: Knowledge and Connections

Typically, Vermont’s RPCs are responsible for a variety of coordinated regional planning duties. County-level government does not exist in Vermont, so the RPCs’ multi-jurisdictional work fulfills an important role. They serve as a link between the state and municipalities, assisting those without staff planners or other administrators. In this context, they assume several traditional roles, including:¹⁶

- Transportation planning
- Land use planning and zoning
- Emergency planning and preparedness
- Natural resource planning
- GIS mapping and analysis

The RPCs’ transportation planning responsibilities are outlined in the state’s Transportation Planning Initiative (TPI), established in 1992 to help VTrans comply with the new outreach expectations in the 1991 federal Intermodal Surface Transportation Efficiency Act. The TPI requires increased consultation between VTrans and local officials and citizens in the transportation planning process. VTrans partnered and contracted with the state’s RPCs to implement the new program, since these regional groups already had years of planning experience and established credibility with local officials and the public. Each RPC operates a regional transportation advisory committee that prepares long-range plans and serves as a forum for participation and input on transportation priorities.



Other tasks include assisting with data collection and management such as infrastructure inventories, traffic counts, mapping, and project management. These tasks are completed according to annual contracts with VTrans, and the RPCs' basic roles in the TPI were codified in state statute in 2007.

In addition to their technical experience in transportation, the RPCs were an important post-Irene resource for VTrans because of their existing relationships with municipalities established through the TPI and other program areas. RPCs such as the Southern Windsor County RPC and Two Rivers-Ottawaquechee Regional Commission facilitate regular regional meetings to bring together the local road foremen, the individuals generally responsible for managing local roads issues. At these meetings, the road foremen often discuss issues such as access management, vegetation control, mutual aid processes, capital programming, conflict management, safety inspections, and other topics relevant to local road managers.¹⁷ The relationships among the RPC staff and town employees built through this ongoing series of meetings took on new importance following the disaster.

While VTrans is only responsible for state highways, the municipalities maintain all other local roads and were accustomed to working with the RPCs on transportation planning and GIS mapping projects. After Irene, "VTrans was so consumed with recovery efforts on the state highway network that they needed assistance coordinating the local road network recovery," says Brangan.¹⁸ RPCs also had established relationships with other state agencies and a network of volunteers. Beyond this local knowledge,

the RPCs had a strong understanding of federal disaster funding, which was crucial for assisting a state administration that had been in office less than one year before the storm.¹⁹

In addition to the existing knowledge and relationships that the RPCs had developed, they also were positioned well to offer the state a seamless delivery system in which each region could be counted on to accomplish its tasks. But this had not always been the case. The RPCs had contracted with the National Association of Development Organizations (NADO) in early 2011 to complete an assessment of their strengths, weaknesses, and opportunities to improve. NADO used a team of national experts and peers (executive directors from similar entities in other states) to analyze the governance, work programs, and organizational capacity of the 11 RPCs by gathering feedback from their directors, staff, and policy board members, the governor's office, state and U.S. legislators, state agencies, and others. Based on this information, NADO developed a report that outlined the findings and steps to improve consistency and position the RPCs to take on new challenges.

Peter Gregory, executive director of the Two Rivers-Ottawaquechee Regional Commission, cites the NADO statewide assessment as significant in the RPCs achieving the quality control necessary to perform at that high level across the state. Gregory says, "Going through the statewide assessment with NADO had a tremendous impact on our operations and ability to work as a cohesive statewide network. Because the process involved outreach to so many agencies and individuals, Sue Minter was aware of the assessment report, the weaknesses that were identified, and the steps we had all taken to improve. Knowing that, I think she was confident that we could perform when she called on the RPCs to assist VTrans with Irene recovery."

Response and Recovery Activities

After Irene, the RPCs continued to rely on their local knowledge and connections to assist VTrans with specific tasks such as mapping and data collection, resource matching, communications, FEMA grants, and technical assistance. While many RPC staff performed these tasks in their own regions, others helped to establish a Regional



Photo courtesy of VTrans

Coordination Center and provided support at the State Emergency Operations Center.

Local Activities

VTrans specifically requested assistance from the RPCs with field work to create detailed inventories of transportation infrastructure. According to Minter, her team at VTrans realized they would fail if they attempted to complete this task alone. The RPCs “came into the recovery efforts a week after the storm had hit, so there was already an overwhelming sense of urgency to quickly determine the magnitude of the damage to the local transportation network,” says Brangan. “This urgency was compounded by the coming change of seasons” and the end of the normal construction season.²⁰

Because of their relationships with road foremen and other key community members and knowledge of the local transportation network, the RPCs were able to identify damage to roads, bridges, culverts, and other assets. RPC staff “met with whoever would know what was going on in the town and where the damage was. This could be the town clerk, the road foreman, the town manager, or a consultant who was brought on board to keep track of that,” says Katharine Otto, assistant planner for the Southern Windsor County RPC.²¹



Southern Windsor County RPC

Regional planning commission staff conducted fieldwork and met with key individuals to gather information about locations where roads, bridges, and culverts were washed out, where fallen trees and other debris needed to be removed, and where streams and rivers had changed course during the flooding.

In this role, RPCs also became involved with recovery project prioritization, development, and management.²² No formal procedures for prioritizing roads to be re-opened existed. Instead, they aimed to increase access as quickly as possible by generally evaluating which routes

In the town of Cavendish, the sudden volume of floodwaters caused the Black River to dramatically change course and carve a 54-foot canyon at the edge of the village. The co-location of utilities with roadways caused additional problems, as in this case where 250 feet of roadway and wastewater line were destroyed.



and destinations were not being served and prioritizing roads that improved mobility and could be easily fixed. Each town's road crew would assess priority based on the needs of the particular community, drawing on the road foremen's local knowledge, such as which residences were only occupied seasonally.

Although the storm's damage was widespread across Vermont, it was not equally distributed, with many impacted roads concentrated in the southern and central parts of the state. For example, the region served by the Southern Windsor County RPC, a rural area between the Green Mountains and the Connecticut River Valley, sustained damage to both major state highway routes as well as local roads, the majority of which are unpaved. The small towns in this region of 25,000 have limited resources and few paid staff, leading to a greater need for assistance after Irene.

Many of the northern RPCs, whose towns suffered less damage, helped those in the southern regions through mutual aid agreements. This primarily consisted of assistance with field work to assess damage, with the visiting staff working directly with the host RPC. The Regional Coordination Center helped to arrange the initial request for support, but the specifics about which towns needed assistance were addressed at the local level. The condition of roads was also a factor in matching RPCs, as not every heavily impacted region was equally accessible from other parts of the state.²³

Regional and State Coordination

To better manage the local activities of 11 regional organizations, the RPCs set up a Regional Coordination Center (RCC), located at the Chittenden County Regional Planning Commission (CCRPC), the state's only Metropolitan Planning Organization. CCRPC staff ran the center with assistance from other northern RPCs' staff, whose regions

suffered less damage. Consultants, the Vermont League of Cities and Towns, and the Associated General Contractors of Vermont were also involved with the communication and mobilization activities at the RCC.²⁴

In addition to matching RPC staff to aid in local assistance with damage assessments, the RCC's main responsibility was compiling and distributing information about damaged infrastructure. The RCC developed an assessment form to collect information about the condition of roads, bridges, and culverts. The field sheet, which was eventually refined four times to improve data collection, compiled information about the damaged asset, repair prioritization and needs, and detours in place. The final version of the form was flexible enough to be used for different towns in different situations. The RCC at first received daily status reports, eventually moving to weekly update emails. Staff continuously updated the database and distributed maps of impacted assets and road statuses.

By the first week of October 2011, the RCC had compiled 2,500 damage assessment forms. Having accurate knowledge of the extent of the damage was an essential aspect in planning the rest of the recovery, and would not have been possible without the RPCs' involvement.

Other critical actions performed by the RCC included coordinating with FEMA, collecting municipal unmet needs, and preparing materials for use by local officials. The RCC was also an important information source, posting updates on the Internet and serving as the State of Vermont Irene Recovery Call Center for two weeks.²⁵

In addition to assisting at the RCC, RPCs had a crucial role at the State Emergency Operations Center (EOC). Vermont Emergency Management, a division of Vermont Public Safety, oversees and operates the EOC. Outside



Photos courtesy of Southern Windsor County RPC

of disaster circumstances, the EOC typically maintains communication with multiple agencies and issues daily situation reports. This communication network includes an emergency planning liaison from each RPC that is responsible for reporting to local communities. Vermont Emergency Management also has a strong partnership with RPCs to deliver nationally standardized emergency management programs to Vermont municipalities. Leading up to Irene's arrival, RPC staff were on standby to assist, anticipating the need for a network across the state. During disaster response and recovery operations, the EOC coordinates a collaborative approach across all levels of government and nongovernmental agencies such as the American Red Cross to meet the needs of Vermonters.

Local Unique ID Number: _____

**Irene Flood Response - Regional Resource Coordination
Local Road Initial Damage Assessment Data Form Version 4**

*****Fill out One Form for Each Damage Area*****

Town: _____ RPC: _____

Road Name/ Number and Location Description (provide adequate detail to locate project on a map such as road name, route number, GPS coordinates (Lat, Long in dec. deg), E911 Address, Mile Marker): _____

Town Contact: _____

Title/Position: _____

Recorded by: _____

Date: _____

Bridge/Culvert Number: _____

Municipal Repair Priority: High Medium Low

Length (feet) of Segment (for roads): _____

Residences Stranded: Yes

How Many: _____

Facility Type: (check all that apply): Road Bridge* Culvert Other Highway

*Will a Temporary Bridge be needed before Winter? Yes Length in feet if known: _____

Status: Closed Emergency vehicle only Open with lane/weight restriction

Open, repair needed Open, Fixed

If facility is closed, is a detour route in place? Yes No

Will the detour be in place for more than one week? Yes

Damage description: _____

Have temporary repairs been made: Yes No Cost of Temporary Repairs _____

Describe temporary repairs: _____

Does Town need assistance in getting repairs started? Yes

Describe resources needed: _____

Image courtesy of VAPDA



Photo courtesy of VT-rans

After the storm, the EOC recognized the need to have all state support functions staffed immediately and requested assistance from the RPCs. The RPC staff with previous EOC experience also identified the need to fill in at the state level. Their tasks included mapping, preparing situation reports, coordinating resources, and maintaining connections with the towns. According to Shaun Coleman, senior planner for the Northwest RPC, this support “added capacity to a very understaffed state EOC at the time,” and raised awareness of what a valuable resource the RPCs are to the state agencies.²⁶

Other Assistance

RPCs also assisted with administering the FEMA Public Assistance Grant Program. According to FEMA, the program “provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities” and “encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process.”²⁷ The RPCs coordinated meetings and briefings and processed paperwork to assist with applications. RPC representatives were present on FEMA site visits to communities seeking assistance. Data and maps created from the field sheets were also helpful in this process. As of June 2012, FEMA staff remained in Vermont assisting with long-term recovery planning.

Lessons Learned

The role of Vermont’s RPCs in responding to transportation system recovery is unique to the individual region or town, since Irene affected each differently and the response by their governing bodies varied. For example, this small community context affected the collection of damage reports. According to Otto, “Each of the towns have different characteristics—they’re very topographically different even though they’re right next door. One town could have a lot of stream bank instability, while



Photo courtesy of VTtrans



Photo courtesy of Two Rivers-Ortauquehee RC



Photo courtesy of Southern Windsor County RPC

another town was suffering more from inundation and other issues. We really couldn't make generalizations that situations in neighboring towns were the same."²⁸ The problems facing Vermont after Irene were very localized.

Overall, the state achieved a successful recovery after Irene. Most damaged bridges and roads were reopened by the end of December, thanks in part to a mild fall and winter that extended the construction season and the extraordinary efforts of all those involved in the recovery efforts. Tourism outreach ensured that visitors in search of fall foliage and snowy slopes knew that they were welcome on the state's roads. Among the reasons for a successful outcome, Minter cited "partnerships and innovation—thinking on the ground, connecting in ways we never had before. We reached out. We knew instantly that VTrans couldn't do this by ourselves."²⁹

Despite this accomplishment, Otto identified several ways RPCs' involvement could be more effective in the future. First, the RPCs recognized a need to formalize their role in emergency response assisting VTrans and other state agencies, so the roles and responsibilities of each organization are clear and the RPCs can adequately prepare their staff. Second, increased communication among different agencies could have improved the collection of information. The magnitude of the disaster required those involved in the recovery to share a large amount of data, which sometimes resulted in redundancy.

To that end, it is important to create systems for maintaining clear communication before, during, and after emergencies. Without standardization, information and data demands can quickly become overwhelming. Referring to the damage assessment form that was revised multiple times, Otto's advice is to "collect *some* information and

collect it well—don't try to collect as much as you possibly could. You'll never collect it all, and you'll just get frustrated."³⁰

Emergency Preparedness

One of the most important outcomes from the Irene recovery was the recognized need for increased disaster planning. Peter Gregory, executive director of the Two Rivers-Ottawaquechee Regional Commission, organized coordinated incident command system training for all of Vermont's RPC directors as well as many senior transportation planners. Other staff can continually expand their training and knowledge to be better equipped when called to assist. For example, the RPCs deliver additional incident command system and emergency medical dispatch training to rural areas.

The Irene recovery helped Vermont realize the value of the State Emergency Operations Center and reflect on how it could be improved. Before the storm, the state administration did not have a full understanding of the EOC's daily functions or its role in an emergency. Since then, administrators have visited the center in an effort to identify roles and responsibilities in all state support functions. After witnessing the contribution of the RPC staff's involvement in the recovery, the state and the EOC aim to train three members of each RPC to function in an emergency.³¹

Disaster response can be more effective if the organizations involved have an understanding of their responsibilities prior to the event. Without predefined roles, Otto says the RPCs had "a variety of hurdles to overcome—issues with funding, new roles being taken, procedures, products, services, and information exchange. Everything was a moving target."³² Vermont's emergency response plan,



Photo courtesy of Southern Windsor County RPC

developed in 2012, will specifically articulate the role of RPCs and other agencies in responding to a disaster to minimize delay in mobilizing resources. In addition, the RPCs will execute memoranda of understanding and agreement with various state agencies to establish funding provisions. Having formalized relationships in place will significantly reduce the learning curve and response time in the event of future emergencies.

The state and the RPCs have placed particular emphasis on preparing for future floods. One element of this is the increasing use of fluvial erosion studies. These studies promote understanding of how streams move and how they are likely to change in natural disasters, helping to identify facilities that are at a higher risk for damage. This information can be used in transportation enhancement grant assessments and in local zoning and other regulations that restrict development in fluvial erosion hazard areas. Certified flood plain managers will also play an increased role with RPC disaster activities.

Looking Forward

In May 2012, Governor Shumlin signed the largest transportation bill in Vermont's history, a \$658 million spending plan for highway repair and construction, citing lessons learned from Irene that will help save time and money completing projects. When announcing the legislation, Shumlin said, "We made a promise to Vermonters that we would rebuild Vermont better than Irene found us—this transportation bill reflects that commitment."³³

Several months into the new construction season, which started in April 2012, Vermont agencies are participating in ongoing discussions about how to learn from and improve upon the Irene experience. While no policies or procedures have yet been formalized, networks of coordination and communication are being evaluated to ensure they will be most effective in the event of another disaster. These efforts will help to ensure that the RPCs and communities are better positioned for long-term resiliency.

The Vermont RPCs' role in the Irene recovery was the subject of a NADO Research Foundation webinar, held on June 8, 2012. A recording is available at www.NADO.org. For more information about the RPCs, visit www.VAPDA.org.

All Hands On Deck: Two Rivers-Ottauquechee Regional Commission

The Two Rivers-Ottauquechee Regional Commission (TRORC) offers an example of how Irene itself, as well as the partnership with VTrans, affected RPC normal operations. Immediately after the storm, TRORC sent staff to the State Emergency Operations Center because they had existing knowledge of how it operated. Once VTrans turned over assessment of all local roads to the RPCs, however, the situation required “all hands on deck,” with the whole office focused on recovery for the six weeks following the storm. After that point, Executive Director Peter Gregory was able to reassign staff to the regular work plan.

TRORC was well prepared to respond in an emergency, with many staff already familiar with incident command system response and other aspects of emergency management. The staff includes experienced GIS analysts and certified flood plain managers that were able to offer technical assistance. The post-Irene experience exposed the entire organization to the breadth of tasks involved with disaster recovery, revealing new components and complementary issues to staff with different areas of expertise. According to Gregory, this cross-training was “a wonderful opportunity for many of us to quickly expand our exposure to new skills.”

Because all of Vermont’s RPCs have well-developed GIS mapping capabilities, Gregory speculated that they would likely have provided road maps with damage locations to FEMA crews regardless of whether or not they were formally engaged with VTrans. Assuming this responsibility was a “natural role to play” for the RPCs, but the partnerships with VTrans and among RPCs made their responsibilities more “consistent across the state and formalized.”

Source: Peter Gregory, personal communication with Kate Humphrey.



Photo courtesy of VTrans

About the NADO Research Foundation

Founded in 1988, the NADO Research Foundation is the nonprofit research affiliate of the National Association of Development Organizations (NADO). The NADO Research Foundation identifies, studies, and promotes regional solutions and approaches to improving local prosperity and services through the nationwide network of regional development organizations. The Research Foundation shares best practices and offers professional development training, analyzes the impact of federal policies and programs on regional development organizations, and examines the latest developments and trends in small metropolitan and rural America. Most importantly, the Research Foundation is helping bridge the communications gap among practitioners, researchers and policy makers.

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Photo courtesy of VTrans

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