



INSTITUTE FOR
**Sustainable
Communities**

Working Group Recommendations

Between February and May 2013, the Institute for Sustainable Communities convened three working groups to engage in a collaborative process to identify strategies and approaches to build resilience in Vermont. The groups were created to address three key areas that had been identified during our October 2012 convening: Emergency Management, Resilient Landscapes and Communities, and Infrastructure and the Built Environment. Working group members represented diverse viewpoints and interests.

Each of the working groups reached a different point by the end of their processes and the following recommendations are at different levels of specificity. Some recommendations also include potential approaches that the working group identified as possible means to reaching the desired end.

The recommendations from each group are organized into the following five categories:

Policy & Planning

Investment & Capital Improvement

Governance and Collaboration

Education, Outreach and Technical Assistance

Data, Inventory & Assessment

Emergency Management

Members of the Emergency Management Working Group met once.

Members of the Emergency Management Working Group:

Kate Ash, Irene Recovery Office

Erica Borneman, Department of Emergency Management and Homeland Security

Zack Borst, Department of Emergency Management and Homeland Security

Chris Company, Windham Regional Commission

Tracy Collier, Central Vermont Community Action Council

Bob Costantino, Agency of Human Services

Larry Crist, Red Cross

Ross Nagy, Department of Emergency Management and Homeland Security

Ben Rose, Department of Emergency Management and Homeland Security

Emergency Management #1: Institutionalize a robust recovery function in the new Hazard and Recovery Office at the Vermont Department of Emergency Management and Homeland Security (formerly Vermont Emergency Management)

Category: Policy and Planning

Potential Approaches:

- Institutionalize robust Public and Individual Assistance Programs
 - Regularize the recovery process for all smaller events and use them as an opportunity to practice for larger events
 - Strengthen the Hazard Mitigation Program.
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Emergency Management #2: Continue to support and institutionalize recovery and resilience at the local level.

Category: Governance and Collaboration

Potential Approaches:

- Strengthen the connection between LTRCs, LEPCs, and municipalities.
- Where possible, channel the expertise of the LTRCs toward preparedness effort.
- Align various service district boundaries so there is more consistency
- Create a peer-exchange network on resilience between the pockets of interested people in communities.

Emergency Management #3: Prepare for potential reductions in federal funding support.

Category: Policy and Planning/ Implementation and Investment

Potential Approaches:

- Optimize the use of the funds available today by building robust infrastructure that will be resistant to future disasters.

Emergency Management #4: Create a resiliency coordination position/function within state government.

Category: Governance and Collaboration

Potential Approaches:

- No specific approaches were identified.

Emergency Management #5: The State of Vermont should lead by example and elevate the public discourse regarding emergency preparedness.

Category: Governance and Collaboration

Potential Approaches:

- Annually, the governor should require each state agency to update its continuity of operations and emergency operations plan. There should be an annual meeting of the cabinet convened by the governor to reinforce the importance of emergency preparedness.
- Institutionalize ICS and Continuity of Operations training within all State Agencies.
- Sustain/enhance the state support functions. Develop more capacity within the State agencies to respond to disasters.

Emergency Management #6: Invest in increasing capacity for emergency management at the local level.

Category: Education, Outreach and Technical Assistance

Potential Approaches:

- Create a peer-exchange learning network between people who are working on emergency management at the local level, including a process for those who were in Irene-affected areas to share expertise with those who were not impacted by Irene.
- Consider mandatory training for emergency management directors
- The next annual preparedness conference should be about resilience.

Emergency Management #7: Create tools to support local communities in response and recovery phases.

Category: Education, Outreach and Technical Assistance

Potential Approaches:

- Ensure that all lessons learned from Irene are captured by creating a guide to recovery.
- Provide communities with tools to track repetitive losses.

Emergency Management #8: Develop and disseminate information about the climate impacts that we need to prepare for in accessible and user-friendly formats that can help to inform hazard mitigation plans and emergency preparedness efforts.

Category: Data, Inventory and Assessment

Potential Approaches:

- No specific approaches were identified.

Resilient Landscapes & Communities

The Resilient Landscapes & Communities Working group established four objectives to guide its choice of recommendations. These objectives emphasize increasing resilience to flooding, but also address increasing resilience to drought, and support building vital and prosperous downtowns and villages:

Protect People, Buildings and Facilities in Vulnerable Settlements

Recommendations should aim to increase the safety and resilience of Vermont's many existing settlements situated near rivers, by ensuring that the buildings and facilities located in flood hazard areas are better able to weather flooding and major storm events with minimal damage, by ensuring that new buildings do not substantially increase risks downstream, and by relocating buildings that are subject to extreme hazards whenever possible, and relocate critical services to safer locations.

Conserve and Avoid Development in River Corridors

Our actions should avoid future development in open river corridors and floodplains upstream of town and village centers, because these places are hazardous locations for buildings, and because protecting them is the most cost effective approach for preventing flooding and erosion damage to communities, properties and infrastructure located downstream. These areas include Vermont's working farms and forests, and actions must also support the economic resilience of this working landscape.

Plan for New Development in Safer Areas

Our actions should help communities grow in a manner that meets community goals, fosters economic health at the local and statewide level, and take advantage of areas planned for growth in safe areas that are located near villages and downtowns. The best actions will be ones that also help Vermont reduce its contribution to greenhouse gas emissions by enabling more efficient building patterns and alternatives to driving.

Manage Stormwater Upland and Everywhere

Our actions should enhance the ability of our landscape to slow stormwater, spread it out, and absorb it into the ground, so that groundwater aquifers, rivers, streams and lakes are replenished with water that is critical for resilience during times of drought, and so that upland land uses don't aggravate flooding and water pollution in lower lying areas.

Members of the Resilient Landscapes and Communities Working Group:

Charlie Baker, Chittenden County Regional Planning Commission
Dan Baker, UVM Department of Community Development & Applied Economics
Diane Bothfeld, Agency of Agriculture
Ann Cousins, Preservation Trust of Vermont
Peter Gregory, Two Rivers-Ottawaquechee Regional Commission
Eric Howe, Lake Champlain Basin Program
Deb Markowitz, Agency of Natural Resources
Noelle Mackay, Department of Housing and Community Development
Sarah McKearnan, Agency of Natural Resources
Joe Segale, VT Agency of Transportation
Josh Schwartz, Mad River Valley Planning District
Keith Thompson, Chittenden County Forester

Land Use #1: Link municipal plans, regional plans, river management/corridor plans, stormwater master plans, and hazard mitigation plans so they are consistent, coordinated, integrated, and improve the efficiency and effectiveness of the planning process. This will allow for the identification of a multitude of risks and a coordinated approach to addressing them.

Category: Policy & Planning

Potential Approaches:

- As necessary, reexamine statutory guidance on integrating these plans.
 - Better utilize and integrate the FEMA framework for all-hazards planning into regional and municipal plans.
 - Create a mechanism that enables a watershed-based approach to planning for development and flood mitigation.
 - Develop and integrate risk management strategies for wastewater treatment facilities, public water supplies and hazardous waste sites into local/ regional plans.
 - Further improve the capacity/capability of regional planning commissions to assist municipalities with the creation of land development regulations that implement integrated plans.
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Land Use #2: Increase emergency planning and preparedness for vulnerable populations.

Category: Policy & Planning

Potential Approaches:

- No specific approaches were identified.

Land Use #3: *(Regulatory) Adopt and implement consistent, flood resilient development standards that a) provide standards for appropriate development within existing villages, downtowns and compact settlements, and b) reduce or restrict development within river corridors outside of these areas.*

Category: Policy & Planning

Potential Approaches:

- State of Vermont would adopt minimum restrictions on floodplain development and require existing development be floodproofed. Municipalities would incorporate these standards into local regulations.
- Establish a new state permitting program for floodplain and river corridor development.
- Expand the jurisdiction of Act 250 so that small-scale residential, commercial and industrial development in floodplains and river corridors receives more robust review as it relates to flood impacts.
- Expand the available incentives (financial, technical and permitting relief) to help municipalities strengthen local flood hazard regulations and channel growth to safe areas and away from undeveloped floodplains and forests. Consider use of CDBG funds to this end.
- Adopt rules governing any floodplain encroachments that are currently exempt from municipal regulation (agriculture, silviculture, transportation, utilities, schools, etc).

Land Use #4: *(Regulatory) Improve management of stormwater runoff.*

Category: Policy & Planning

Potential Approaches:

- Support municipalities in adopting stormwater regulations for new development (including driveways).
- Encourage greater utilization of Low Impact Development (LID) and green infrastructure. Improve the regulatory framework, develop incentive-based programs, provide technical assistance and support outreach and education efforts.
- Create disincentives and mitigation requirements when areas providing flood and water quality benefits are lost to development, i.e., increases in impervious surfaces, loss of tree cover, changes in hydrology that threaten groundwater recharge or increase sedimentation, etc.
- Regulate stormwater on sites below the current regulatory threshold (1 acre).
- Work with Better Backroads Program on managing road runoff.

Land Use #5: (Regulatory) Provide incentives and disincentives that direct Vermont-scale development toward the least flood-prone and stormwater-impacted areas.

Category: Policy & Planning

Potential Approaches:

- No specific approaches were identified.

Land Use #6: (Non-Regulatory) Work with private land owners to implement land use and management practices that will reduce flood impacts.

Category: Investment & Capital Improvement

Potential Approaches:

- Work with owners of agricultural land in floodplains to find solutions that allow these areas to be used to store and retain floodwaters.
- Invest in property owners who's land is providing flood resilience benefits (i.e. owners of farm and forestland near streams and rivers) to conserve their lands through new or revised easements, contracts or tradable development permits.
- Develop flood resilience guidelines to support the agricultural community's efforts to manage land in the face of more of more frequent and severe storms.
- Support landowners, including farmers, to develop plans that jointly serve their business interests while improving resilience.
- Provide tax reductions for property owners who use siting and conservation practices that enhance flood resilience.
- Reduce financial incentives to subdivide land that contributes to ecosystem services.
- Work with landowners to proactively address invasive species.

Land Use #7: Encourage and support relocation of vulnerable housing, especially mobile home parks.

Category: Investment & Capital Improvement

Potential Approaches:

- Establish funding mechanisms that can be flexible and opportunistic in regard to mobile home buy-outs and support relocation.
- Support efforts to find relocation sites.

Land Use #8: Establish funding mechanisms to support the purchase of hazard-prone properties and/or conserves land that contributes flood resilience benefits.

Category: Investment & Capital Improvement

Potential Approaches:

- Develop dedicated funding source for conserving lands that provide flood attenuation and/or help species adaptation to climate change. Fund could be used to support buy-outs.
- Encourage nonprofits (Trust for Public Lands, Vermont Land Trust, The Nature Conservancy, Vermont River Conservancy, and Vermont Housing and Conservation Board) to set aside a portion of annual conservation funding for prioritized parcels/homes that are vulnerable to flooding or erosion.

Land Use #9: Promote community/public acceptance of floodplain management, river management, and stormwater issues, principles and regulations.

Category: Education, Outreach and Technical Assistance

Potential Approaches:

- State and regional entities should develop outreach programs to engage with local governing bodies and communities to help them understand why protections of floodplains and compliance with floodplain development restrictions are critical to increasing flood resilience.
- Initiate an outreach effort coordinated by a Statewide Flood Resilience Office/Coordinator working closely with municipalities, regional planning commissions and natural resource conservation districts.
- Have regular meetings of civic leaders, including community leaders, chambers of commerce, higher education and state government.
- Improve education and training on river management for local officials.
- Create a computer program or game that enables local officials to see how upstream mitigation projects can reduce downstream vulnerabilities.
- Outreach to general public and through schools: “Make Room for Rivers” and stormwater practices for everyone.
- Use pilot projects to improve connections between residents and rivers.
- Identify and promote the economic benefits of flood resilience (ex. avoided costs) by showing the dollar values associated with action vs. “business as usual” scenarios.

Land Use #10: Expand and improve the technical assistance to municipalities.

Category: Education, Outreach and Technical Assistance

Potential Approaches:

- Increase post-disaster technical assistance available to municipalities.
- Further improve the capabilities of the regional planning commissions to assist municipalities with the development of zoning bylaws and other land development regulations to effect hazard mitigation and improve water quality.
- Further improve the capabilities of the regional planning commissions and natural resource conservation districts to assist municipalities with improving water quality through stormwater outreach, riparian habitat improvement, etc.
- Further improve capabilities of Regional Planning Commissions to assist municipalities with hazard mitigation planning specifically and emergency management in general and to prioritize mitigation investments.
- Assemble and package guidance on flood resilience; work with RPCs to deliver to municipalities and integrate into Hazard Mitigation Planning.

Land Use #11: Develop and update accurate river corridor maps for the entire state that clearly indicate high hazard areas, integrate consideration of uplands into river corridor mapping, identify opportunities to reduce flood impacts, and provide guidance to prioritize investment in flood mitigation. Utilize maps to identify highest risk locations for detailed river corridor planning that will result in specific recommendations for buy-outs, land conservation, floodplain restoration, green infrastructure and other mitigation actions.

Category: Data, Inventory & Assessment

Potential Approaches:

- Develop an ongoing and sustained river corridor mapping program at the Agency of Natural Resources which will provide technical support and capacity to produce, utilize and update river corridor maps.
- Municipalities and Regional Planning Commissions will integrate river corridor maps into local and regional land use plans, regulations and hazard mitigation plans with special attention to how defined corridor areas interact with existing development.
- Put in place a process for ongoing updates as Vermont's dynamic rivers change. Part of this process should include education about how each part of the landscape contributes to resilience, and how each resource can contribute to that understanding/analysis.
- Create clarity and consistency in how maps are used in regulatory processes.

Land Use #12: Create consistency between state program and policies.

Category: Data, Inventory & Assessment

Potential Approaches:

- Incorporate river science and management strategies into other state programs and policies, as appropriate.

Land Use – Lower-priority strategies discussed:

- Retrofit existing buildings in flood hazard areas to increase their resistance to flooding.
- Incorporate climate mitigation and adaptation into land use planning and development.
- Protect the integrity of the river corridor by prohibiting bank armoring (ie, rip rap).

Infrastructure and the Built Environment

The Infrastructure and Built Environment Working Group met 3 times to develop ideas for improving the resilience of Vermont's infrastructure and built systems.

Members of the Infrastructure and the Built Environment Working Group:

Eric Blatt, Vermont Department of Environmental Conservation

Michele Boomhower, Chittenden County Regional Planning Commission

Mike Burke, Green Mountain Power

Gina Campoli, VT Agency of Transportation

Andrea Cohen, Vermont Businesses for Social Responsibility

Peg Elmer, Resilientcommunities.org

Shaun Fielder, Vermont Rural Water Association

David Grass, Vermont Department of Health

Karen Horn, Vermont League of Cities and Towns

Bill Jordan, Vermont Department of Public Service

Kelly Launder, Department of Public Service

Sarah McKearnan, Agency of Natural Resources

David Mears, Department of Environmental Conservation

Jim Sullivan, Bennington County Regional Commission

***Infrastructure #1:** Increase and enhance local, regional, and state pre-disaster mitigation planning to identify and fully document infrastructure damage and needed upgrades, relocations and recovery projects.*

Category: Policy and Planning

Potential Approaches:

- Debrief the process that was used to develop the 2013 Hazard Mitigation Plan and identify opportunities to improve the engagement, timeline (create more time for participation), and transparency in the process. Include local and regional representation in the debrief.
- Develop a hazard mitigation planning process that meets FEMA’s requirements while also better incorporating Vermont’s needs.
- Ensure that hazard mitigation, land use and river corridor plans are appropriately integrated.
- Expand the involvement of infrastructure managers in the pre-disaster hazard mitigation planning process.
- Data and technical assistance is provided to municipal and regional planners regarding infrastructure, risk and mitigation practices.
- Hold annual briefing for local officials at the regional level to refresh recovery plans and identify funding mechanism for implementation.
- Utilize the resiliency coordination position, if created, to help expand engagement in hazard mitigation and resiliency planning.

***Infrastructure #2:** Enhance growth center planning and adoption to include river corridor planning and mechanisms to ensure that economic development is supporting the implementation of mitigation strategies that would protect the center from flood and fluvial erosion.*

Category: Policy and Planning

Potential Approaches:

- No specific approaches were identified.

Infrastructure #3: *Establish and implement consistent standards for river management and river-related infrastructure to ensure that new or replacement structures (i.e., bridges and culverts) are more resilient in future floods.*

Category: Policy & Planning

Potential Approaches:

- Revise standards as necessary, including but not limited to Vermont Stream Alteration Rules and ANR/VTrans Technical guidance
- Revise bridge and culvert standards to meet the intentions of state and federal law to address fluvial and ecological concerns
- Continue ANR/VTrans collaboration on near and long term policy, planning and implementation opportunities and challenges.
- Provide training programs regarding new standards.

Infrastructure #4: *Create Resilient Right-of-Ways along state and local roads for co-location of power, telephone, broadband, culvert and road improvements.*

Category: Investment & Capital Improvement

Potential Approaches:

- No specific approaches were identified.

Infrastructure #5: *Incentivize resilience for projects applying to state grant or revolving loan funds through prioritization of infrastructure projects that increase system resilience. Conversely, disincentivize projects that do not demonstrate resilience to future hazards.*

Category: Investment & Capital Improvement

Potential Approaches:

- No specific approaches were identified.

Infrastructure #6: Implement strategies to adapt the transportation system to flooding and other effects of climate change.

Category: Investment & Capital Improvement

Potential Approaches:

- Assess the vulnerability of the state's transportation network and develop methods to determine risk. Use these methods to prioritize resources.
- Identify a wide range of adaptation strategies that set roadway function priorities based on sustainable growth and economic development along with safety and other conventional concerns and identify innovative adaptation solutions such as disinvestment, land use protections, wetlands conservation, as well as innovative design and construction.

Infrastructure #7: Implement strategies to adapt water and wastewater infrastructure to flooding and other climate impacts.

Category: Investment & Capital Improvement

Potential Approaches:

- Evaluate State construction and design standards for water and wastewater infrastructure and adjust standards, if needed, to prevent future adverse impacts to floodplain functions and ensure that systems built in flood hazard areas are as resistant to flood damage as possible.
- Identify appropriate adaptation strategies
- Provide incentives for the implementation of adaptation strategies.

Infrastructure #8: Explore the potential for decentralized energy, sewer and water infrastructure to provide system redundancies or otherwise support community/individual self-sufficiency.

Category: Investment & Capital Improvement

Potential Approaches:

- No specific approaches were identified.

Infrastructure #9: *Create a funding mechanism for entities from various sectors to "credit share" for discharge standards.*

Category: Investment & Capital Improvement

Potential Approaches:

- Enable discharge facilities to collaborate with farmers in local or nearby communities to implement conservation practices, such as buffer strips, to address runoff or erosion.

Infrastructure #10: *Establish an ANR-based incident Command System with a network of River Management Engineers, Scientists, and Restoration Specialists prepared and operationally supported to respond rapidly after a flood disaster and provide technical assistance in restoring infrastructure and managing debris.*

Category: Investment & Capital Improvement

Potential Approaches:

- Create a trained "cadre" that can be activated/deployed during emergencies.

Infrastructure #11: *Create a mechanism by which state agencies can coordinate efforts related to resilience, including land use planning, natural resource management, and hazard mitigation planning.*

Category: Collaboration and Governance

Potential Approaches:

- Create a high level staff position in the governor's office: 'resilience coordinator.'
- Formalize cross agency collaboration.

Infrastructure #12: *Provide education and training regarding river science and management to those who manage and maintain infrastructure systems.*

Category: Education, Outreach, Technical Assistance

Potential Approaches:

- Work with Vermont Education and Training Collaborative (managed by the Vermont Association of Planning and Development Agencies)
- Provide all VTrans employees (and continuously update) with river science knowledge and expertise appropriate for their job responsibilities.

Infrastructure #13: *Provide additional training and technical assistance to municipalities to:*

- 1) *Identify projects and operational strategies for improving the resilience of water and wastewater systems and other critical infrastructure (e.g. by adding redundancy, or mitigating major hazards such as pipes lying in rivers)*
- 2) *Secure funding through existing federal grant and loan programs (and other sources) to implement those projects*
- 3) *Conduct return on investment analysis for infrastructure investments*
- 4) *Utilize Asset Management tools*

Category: Education, Outreach, Technical Assistance

Potential Approaches:

- Building on existing training and TA programs, such as VT Rural Water, Vermont League of Cities and Towns and VT Education and Training Collaborative.

Infrastructure #14: *Develop community resilience organizations with members from: planning boards, conservation commissions, emergency and human service organizations. Conduct annual statewide trainings*

Category: Education, Outreach, Technical Assistance

Potential Approaches:

- No specific approaches were identified.

Infrastructure #15: Develop tools that will enable infrastructure managers to see value of investment vs. the mid- and long- terms costs if no improvements/changes are made.

Category: Data, Inventory and Assessment

Potential Approaches:

- Expand the existing bridge and culvert tool inventory so it can be used to map critical culverts and their vulnerability with the capacity for overlays of previous failures and repeat damage assessment.
- Develop a tool in which infrastructure damage can be easily mapped and documented. Develop an overlay feature so that other data can be viewed alongside damage.
- Develop case studies demonstrating the value of adaptation practices.
- Engage economic and community development organizations in the analysis of potential improvements.

Infrastructure #16: Support a sustained mapping program responsible for developing and maintaining river corridor maps.

Category: Data, Inventory and Assessment

Potential Approaches:

- Adopt State River Corridor Procedures and Floodplain Rules, supported by a flood and fluvial erosion mapping program, and followed by a revision of other pertinent State rules and procedures to fully implement a state flood and fluvial erosion avoidance strategy.
- Ensure that maps are available in a user-friendly format through VCGI.
- Ensure that maps are ground-truthed and regularly updated to account for natural changes in river course.

Infrastructure #17: Improve the availability of climate projection data for the State of Vermont.

Category: Data, Inventory and Assessment

Potential Approaches:

- Convene a data working group through Vermont Climate Cabinet or other venue to identify data needs.
- Engage further with universities.