2018 Vermont State Hazard Mitigation Plan

Making Vermont safer and more resilient in the face of climate change and natural disasters
Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects.

The impact of anticipated yet unpredictable natural events can be reduced through community planning and implementation of cost effective, preventive mitigation efforts.

The State of Vermont understands that it is not only less costly to reduce vulnerability to disasters than to repeatedly repair damage, but that we can also take proactive steps to protect our economy, environment and most vulnerable citizens from inevitable natural hazard events. This Plan recognizes that communities have the opportunity to identify mitigation strategies during all phases of emergency management (preparedness, mitigation, response, and recovery) to more comprehensively address their vulnerability. Though hazards themselves cannot be eliminated, Vermonters can reduce our vulnerability to hazards by improving our understanding of both the natural hazards we face and their potential impacts.

The 2018 Vermont State Hazard Mitigation Plan (SHMP) presents the hazard impacts most likely to affect Vermont and a mitigation strategy to reduce or eliminate our most significant vulnerabilities. This SHMP is a complete rewrite of the 2013 Plan, both in the content of the Plan document and its mitigation actions. Vermont Emergency Management, along with key stakeholders, completed a thorough review of the 2013 SHMP at the beginning of the update process to ensure that nothing developed in previous versions would be lost in this rewrite process.

Audience and Use:

The 2018 Vermont SHMP was developed to help the State of Vermont and local governments identify all natural hazards facing our communities and establish actions that reduce risk. The planning process for this update was much broader than previous mitigation planning efforts in order to better integrate the work of State agencies with those of regional and local governments, as well as nonprofit and private partners. The SHMP will serve as a resource for State agencies and other resilience stakeholders to better understand Vermont’s exposure to natural hazards and collectively implement actions that reduce our vulnerability.

While the Vermont Division of Emergency Management (VEM) produced this Plan, a large network of stakeholders across Vermont have worked together to develop the capability inventory and actions. Accordingly, few of the actions in the 2018 SHMP fall solely on VEM to implement; most will require ongoing, concerted engagement by multiple stakeholders over the next five years.

This Plan is also intended to be a valuable resource for Local Hazard Mitigation Plan (LHMP) development. The capabilities list and disaster history spreadsheet are examples of resources that can be pulled directly from the SHMP for use in LHMPs. Further, several of the mitigation actions in this Plan aim to simplify the LHMP development process.
ACKNOWLEDGEMENTS

Though there was a great deal of stakeholder engagement during the planning process, we would like to extend a special thanks to the following individuals for their technical assistance during Plan development:

- **Mike Kline** | Rivers Program Manager | ANR Department of Environmental Conservation
- **Rob Evans** | State Floodplain Manager | ANR Department of Environmental Conservation
- **Jared Ulmer** | Climate and Health Program Coordinator | Vermont Department of Health
- **Rose Paul** | Director of Critical Lands and Conservation Science | The Nature Conservancy
- **Marjorie Gale** | State Geologist | ANR Department of Environmental Conservation
- **Joe Segale** | Policy, Planning & Research Bureau Director | Vermont Agency of Transportation
- **Ben Green** | Dam Safety Engineer | ANR Department of Environmental Conservation

Thank you also to our committee members and the individuals who participated in the Working Groups and Focus Groups.

*Photo Credit: Stephanie Smith, VEM*
THE PROCESS

In previous iterations of Vermont SHMPs, Plan development was the responsibility of VEM and sister State agencies. Recognizing that resilience efforts in Vermont are far more expansive than the work carried out solely by State government, this SHMP represents a robust, inclusive planning process that better addresses and incorporates statewide mitigation initiatives.

<table>
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<tr>
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<tr>
<td>Secretary Susanne Young</td>
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<td>Secretary Julie Moore</td>
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<td>Secretary Michael Schirling</td>
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<td>Secretary Joe Flynn</td>
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<td>Commissioner Chris Cole</td>
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<td>Secretary Anson Tebbetts</td>
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<td>Director Erica Bornemann</td>
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In early 2017, the State Hazard Mitigation Planning & Policy Committee (SHMPPC) addressed the need for involving a more diverse group of stakeholders by authorizing the creation of the State Hazard Mitigation Plan Steering Committee to guide the Plan update process and engage a larger audience. The Steering Committee is comprised of members from Federal and State government, as well as the nonprofit and private sectors. Other partners were also involved in SHMP development through Working Group and Focus Group opportunities.

VEM mitigation staff (Lauren Oates, State Hazard Mitigation Officer, and Stephanie Smith, Hazard Mitigation Planner) coordinated the overall planning process and Plan development. Community Workshop facilitated and designed the stakeholder engagement process. For more information on Plan development, see: Planning Process.

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<td>Bob Costantino</td>
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<td>Catherine Dimitruk</td>
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<td>Chris Cochran</td>
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<td>Gaye Symington</td>
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<td>Tara Kulkarni</td>
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<td>Tim Schmalz</td>
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Figure 1: 2018 Vermont SHMP - Stakeholder Engagement Process

**Launched the Process**
- **2017**
  - SHMP Planning & Policy - February
  - SHMP Planning & Policy - March

**Understanding the Challenges**
- **2017**
  - 2013 SHMP Review
  - Goal Setting
  - Planning Process
  - Stakeholder Mapping
  - Committee Structure
  - Process Vision
  - Capability Assessment

**Finding Solutions**
- **2017**
  - Hazard Assessment
  - Action Development Plan
  - Meeting-in-a-Box
  - Expert Action Review
  - Host a Poster

**Creating a Plan**
- **2018**
  - “Big Idea” Actions
  - Action Focus Groups - November
  - Steering Committee - November
  - Finalize Hazard Assessment
  - Action Prioritization Process

**Moving Forward**
- **2018**
  - Expert Action Review - January
  - Action Focus Groups - February
  - Finalize Actions
  - Prioritize Top Actions
  - Steering Committee - March

**2017**
- Working Groups - June
- Steering Committee - July
- Working Groups - August
- Steering Committee - September
- October - November
- Action Focus Groups - November
- Steering Committee - March
- Working Groups - December
- Built Environment
- Natural Environment
- Planning & Policy
- Education & Outreach

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<th>Months</th>
<th>Activities</th>
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<tr>
<td>February</td>
<td>SHMP Planning &amp; Policy</td>
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<td>March</td>
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<td>April</td>
<td>SHMP Planning &amp; Policy</td>
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<td>May</td>
<td>Steering Committee</td>
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<td>June</td>
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<td>October</td>
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<td>November</td>
<td>Action Focus Groups</td>
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<td>December</td>
<td>Working Groups</td>
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**Themes**
- Goal Setting
- Planning Process
- Goal & Strategy Development
- Action Development
- Vulnerable Populations
- Climate Change
- Economy
- “Big Idea” Actions
- Built Environment
- Natural Environment
- Planning & Policy
- Education & Outreach

**Review**
- Process Review
- Top Priority Action Review
- SHMP Planning & Policy
- Plan Document Review
- Implementation Steps
- Steering Committee & Working Groups
KEY CAPABILITY IMPROVEMENTS

This Plan conveys an array of mitigation capabilities that exist within Vermont. The capabilities section and its extensive inventory address both the improvements of existing capabilities, as well as new capabilities that have been developed since the 2013 SHMP. The most significant improvements or additions to Vermont’s mitigation efforts are identified below. For information on all capabilities identified through this process, see: State & Local Capabilities.

2018 SHMP Planning Projects:

VEM was awarded funding through FEMA’s Hazard Mitigation Grant Program (HMGP) to develop the 2018 Vermont SHMP. As part of this planning grant, VEM received funding for three planning efforts to be carried out by the Agency of Natural Resources (ANR), the Agency of Transportation (VTrans) and Buildings & General Services (BGS), each of which significantly enhances the State’s mitigation capabilities. These planning tasks represent a new level of proactive coordination and program integration among State agencies, which are part of an effort to institutionalize hazard mitigation and resilience efforts within State government and expand ownership of the 2018 State Hazard Mitigation Plan.

ANR Project | Statewide River Corridors Risk Analysis and Hazard Mitigation Prioritization Tool: ANR modified Vermont’s Statewide River Corridor Base Map to develop the map as a risk analysis, mitigation and conservation prioritization tool for use by State, regional and local governments. ANR aimed to increase understanding of the risks of fluvial erosion and to identify specific mitigation actions for reducing vulnerability. Using the template project table developed as part of this project, ANR, Regional Planning Commissions and VEM will endeavor to increase the use of project tables in municipal planning and capital improvement efforts Statewide.

VTrans Project | Methods and Tools for Transportation Resilience Planning: VTrans developed a Methods and Tools for Transportation Resilience Planning (TRPT) application that identifies the specific road infrastructure sites most vulnerable to damage from flooding in three pilot watersheds. The tool also estimates risk based on both the vulnerability and criticality of road segments and identifies a list of potential mitigation measures that can be taken to reduce infrastructural vulnerability. Though currently only available for three watersheds, this Plan’s mitigation actions include expanding the tool to all watersheds across Vermont and including other critical infrastructure, such as utilities.

BGS Project | State Facility Inventory and Assessment: BGS completed a vulnerability assessment of all State buildings in order to better understand their respective risks from flooding. The resulting building inventory tool will serve State planners in prioritizing the most cost-effective flood mitigation needs and opportunities to reduce future damages and increase resilience for existing State facilities.
Emergency Relief & Assistance Fund:

Vermont’s Emergency Relief & Assistance Fund (ERAF) provides State funding to match FEMA Public Assistance grants following a federally-declared disaster. In 2014, the ERAF criteria were revised to incentivize communities to be more proactive prior to disasters. The default rate for State contribution towards non-federal Public Assistance match following a declared disaster dropped to 7.5%, requiring municipalities to cover the other 17.5% for Public Assistance projects. However, municipalities that take the following proactive measures are awarded 12.5% State match:

1. Participate in the National Flood Insurance Program (NFIP),
2. Adopt Town Road and Bridge Standards that meet or exceed the VTrans 2013 template,
3. Adopt a Local Emergency Operations Plan annually, and
4. Submit a Local Hazard Mitigation Plan to VEM for review

Municipalities that wish to further decrease their cost share to 7.5%, with a 17.5% State match, must also meet one of the following criteria:

5. Adoption of ANR’s River Corridor bylaws, or
6. Enrollment in the Community Rating System (CRS), whereby the community must earn credit under Activity 430

A priority mitigation action in the 2018 SHMP is to assess the effectiveness of the current iteration of the ERAF rule in incentivizing proactive mitigation measures, and to revise the rule to improve it, if needed.

Vermont Stream Alteration General Permit (SAGP) Revision:

A notable advancement in hazard mitigation initiatives during the past few years has been the revision of Vermont’s Stream Alteration General Permit (SAGP), and FEMA’s subsequent recognition of the new general permit as “codes and standards” for purposes of future Public Assistance repairs. For several disasters following Tropical Storm Irene in 2011, VEM, ANR and VTrans worked with FEMA Region I on a case-by-case basis to have upsized drainage structures deemed fully-eligible for Public Assistance funding under Section 406 hazard mitigation of the Stafford Act. Beginning with DR-4330, which was declared in 2017, structure replacements that fall under the jurisdiction of the SAGP, and are required to meet the standards of the SAGP, are presumed to be PA-eligible and do not require approval by FEMA prior to construction, though certain projects may require environmental planning and historic preservation (EHP) review before breaking ground. This significant improvement allows Vermont to more quickly and appropriately address vulnerable infrastructure in a more sustainable way than has typically been implemented during the immediate response and recovery phase following a disaster.
Hazard Mitigation Assistance Projects:

Since Tropical Storm Irene, Vermont has been proactive in addressing its vulnerability to natural hazards. Through various funding sources, primarily the Hazard Mitigation Assistance (HMA) grant programs, we have acquired and demolished nearly 150 flood-vulnerable properties, completed approximately 70 infrastructure improvement projects, developed LHMPs for 142 municipalities and carried out a handful of 5% Initiative projects. Since the 2013 SHMP, VEM mitigation staff have been more aggressive in applying for Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) funding as a supplement to Hazard Mitigation Grant Program (HMGP) disaster funding. Most notably, through coordinated efforts with State, regional and local project developers, Vermont has been prioritizing larger mitigation initiatives that more comprehensively address vulnerability, like floodplain restoration efforts in Middlebury, Cambridge, Brattleboro and Waterbury.
HAZARD ASSESSMENT

VEM staff used several methods to identify risks in Vermont, including the evaluation of historical data, consideration of our changing climate trends, and feedback from stakeholders during the hazard assessment process. The most significant change from the 2013 SHMP to the 2018 SHMP is the way hazards are assessed. Instead of continuing to view hazards as events (e.g. hurricanes), this Plan assesses the impacts of events (e.g. inundation flooding, fluvial erosion, and wind as impacts of a hurricane event), as it is the impacts, not the events, that can be mitigated.

The results of the hazard assessment ranking by the Steering Committee are found in Table 3. As with the previous SHMP, fluvial erosion and inundation flooding continue to be the first and second most significant natural hazards in Vermont, respectively. For more information on all hazards addressed, see: [Hazard Assessment](#).

<table>
<thead>
<tr>
<th>Hazard Impacts</th>
<th>Probability</th>
<th>Infrastructure</th>
<th>Life</th>
<th>Economy</th>
<th>Environment</th>
<th>Average:</th>
<th>Score*:</th>
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<tr>
<td>Fluvial Erosion</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3.75</td>
<td>15</td>
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<td>Inundation Flooding</td>
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<td>3</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
<td>6</td>
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<td>Drought</td>
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<td>6</td>
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<td>Landslides</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>Wildfire</td>
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<td>3</td>
<td>3</td>
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<td>2</td>
<td>2.75</td>
<td>5.5</td>
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<td>Earthquake</td>
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<td>3</td>
<td>3</td>
<td>2</td>
<td>2.75</td>
<td>5.5</td>
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<tr>
<td>Invasive Species</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1.75</td>
<td>3.5</td>
</tr>
<tr>
<td>Infectious Disease Outbreak</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1.75</td>
<td>3.5</td>
</tr>
<tr>
<td>Hail</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
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*Score = Probability x Average Potential Impact

Snowmobile bridge near Waterbury, VT flexes as debris and water rush past following Tropical Storm Irene

*Photo Credit: www.mansfieldheliflight.com/flood*
Climate Change:

Warming temperatures, shrinking winters and increasing incidence of intense storm events are beginning to have a significant impact on Vermont’s economy, people and environment and require immediate attention across all planning efforts at the local, regional, state, federal and global levels. Accordingly, and as a guiding principle of this Plan, we have aimed to recognize and include the impacts of climate change throughout Plan development, most notably reflected in the hazard profiles and mitigation actions. Both direct and indirect impacts of climate change are addressed within pertinent hazard profiles, as well as the potential for compounding impacts. An example of a concerning compounding impact of climate change is that warming temperatures (Figure 3) will allow for increased survivability of forest pests, such as the Emerald Ash Borer. This invasive species can decimate Vermont’s ash population, not only shifting the composition of our forests, but also creating additional debris that may exacerbate impacts of other hazards, such as flooding or wildfire.

Vermont’s Annual Maximum and Minimum Temperatures (1960-2015)

![Figure 3: Vermont’s annual maximum and minimum temperatures (1960-2015)](image)

Data Source: climatechange.vermont.gov
MITIGATION STRATEGY

At the request of the SHMPPC in early 2017, the Steering Committee worked to develop a mitigation strategy that would be implementable, leverage cross-sector resources and effectively and efficiently reduce Vermont’s vulnerability to natural hazards. To do this, the Steering Committee first developed the following four goals of the 2018 SHMP:

- Protect, restore and enhance Vermont’s natural resources to promote healthy, resilient ecosystems.
- Enhance the resilience of our built environment – our communities, infrastructure, buildings, and cultural assets.
- Develop and implement plans and policies that create resilient natural systems, built environments, and communities.
- Create a common understanding of – and coordinated approach to – mitigation planning and action.

Using these goals, Working Groups and Focus Groups developed a significant list of mitigation actions. These actions were sorted by goal and then further sorted according to similar themes, called “strategies”. The Steering Committee then prioritized the list of 96 mitigation actions based on each individual action’s Impact and Feasibility. This prioritization process yielded 24 priority actions, which were then further prioritized into the following top five priorities by the Steering Committee:

- Develop a cross-sector buyout program
- Inventory and protect critical headwater and floodplain storage areas
- Collaborate across flood resilience, water quality and habitat connectivity programs and funding
- Audit State programs to assess and improve their support of mitigation goals
- Coordinate State programs to promote development, sharing and maintenance of hazard-related data and mapping

The majority of the mitigation actions identified in this Plan require collaboration between multiple organizations. Though this will necessitate significant coordination, we believe it also broadens ownership, and therefore improves the implementation potential of the 2018 SHMP. For the full list of mitigation actions, see: Mitigation Strategy.
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October 18, 2018

Mr. Douglas F. Wolcott, Jr., Acting Deputy Regional Administrator
Department of Homeland Security/FEMA Region I, 99 High Street, Sixth Floor
Boston, MA 02110-2132

Dear Mr. Wolcott:

I am pleased to submit the newly updated 2018 State Hazard Mitigation Plan (SHMP) on behalf of the State of Vermont. This 2018 SHMP has been developed in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended by the Disaster Mitigation Act of 2000 (Public Law 106-390) and the planning requirements of the Final Rule Title 44 Code of Federal Regulations (CFR) Parts 201 and 206. Also, pursuant to the National Flood Insurance Act of 1968, as amended.

Director Erica Borthmann of Vermont Emergency Management (VEM) and the partner agencies of the State Hazard Mitigation Planning and Policy Committee (SHMPPC) have endorsed the 2018 SHMP submitted to FEMA. Upon having received conditional approval by FEMA, this letter constitutes formal adoption of the Standard SHMP by the State of Vermont. Given formal approval of the 2018 SHMP by FEMA, the State of Vermont will be considered eligible for the 15% level of Hazard Mitigation Grant Program (HMGP) funding in the aftermath of a federally declared disaster. With State adoption of our 2018 SHMP, Vermont will also be eligible for grant funds through Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), Fire Mitigation Assistance Grants (FMAG), and Public Assistance Categories C-G (PA C-G).

The State of Vermont will comply with all applicable Federal laws, regulations and statutes regarding hazard mitigation grant funding requirements, as outlined in 44 CFR § 201.4 (c) 7, in compliance with § 13.11 (c). The State will also comply with all provisions of § 201.4 (c) 7 in accordance with all applicable Federal laws, statutes and regulations in effect with respect to periods for which it received grant funding, in compliance with 44 CFR 13.11 (c) and 2 CFR 200. The State will also amend the 2018 SHMP whenever necessary to reflect changes in State and Federal statutes as required in accordance with 44 CFR § 13.11 (d).

The State of Vermont 2018 SHMP has been approved for release by the office of the Secretary of Administration, based upon the endorsement of the Vermont Emergency Management (VEM) Director and member agencies of the State Hazard Mitigation Planning and Policy Committee (SHMPPC). As the Governor’s Authorized Representative (GAR), I am authorized to adopt the 2018 SHMP on behalf of the State of Vermont. With my signature below, I am adopting the 2018 Vermont State Hazard Mitigation Plan.

Sincerely,

Susanne R. Young, Secretary of Administration
Governor’s Authorized Representative