Town of Shoreham, Vermont

Single Jurisdiction All-Hazards Mitigation Plan

Final Plan Adoption Date: / /2026 *FEMA Approval Date: / /2026*

Shoreham LHMP Executive Summary 2026

The Town of Shoreham updated its All-Hazards Mitigation Plan in 2025 and 2026. Town officials and citizens conducted a hazards inventory and risk assessment matrix, identified locations where hazards are known to the community, and identified potential mitigation projects associated with priority hazards.

The Hazard Mitigation Planning Committee identified the following hazards as their **Highest Priorities**, *based on probability, warning time, geographic impacts, and potential impacts:*

- **Severe Heat (Risk Score 9.00)**
- **Widespread Power Failure (8.25)**
- **Highway Accident (8.00)**
- **Structure Fire (8.00)**
- **Invasive Species (8.00)**

High Priority:

- **High Winds (6.75)**
- **Severe Snow Storm (6.75)**
- **Flash Flood (6.00)**
- **Severe Cold (6.75)**
- **Drought (6.00)**
- **Air Quality (6.00)**

Moderate Priority:

- **Severe Ice Storm (5.25)**
- **Hail Storm (4.50)**
- **Wildfire (4.25)**
- **Insect-borne Illness (5.25)**
- **Infectious Disease/ Pandemic (4.50)**
- **Lightning Storm (3.75)**
- **Large-Scale Hazardous Materials Incident (5.00)**
- **Tornado (3.50)**

For each high-vulnerability hazard type, the committee considered previous occurrences and extent, current vulnerability, and future probability. The committee set these overall mitigation goals and objectives:

Goal 1: Increase Individual Awareness of Shoreham's Vulnerability to Natural Hazards and Work towards developing a Community Social Resilience Ethic

Objective: Inform and educate the community about the types of hazards the Town of Shoreham is exposed to, where they occur, how to prepare, and recommended responses

Goal 2: Reduce Vulnerability of People, Property, and the Environment to Natural Hazards

Objective: Provide mechanisms to enhance life safety
Objective: Reduce impacts to critical facilities and services
Objective: Reduce impacts to existing buildings and infrastructure to the extent possible
Objective: Reduce impacts to future development and infrastructure to the extent possible
Objective: Reduce impacts to the town's natural and historic resources
Objective: Reduce impacts to public health

Goal 3: Increase Interagency Capabilities and Coordination to Reduce the Impacts of Natural Hazards

Objective: Continue to collaborate and coordinate with other agencies on planning, projects, hazard response, and funding opportunities

The Hazard Mitigation Planning Committee has developed a prioritized list of future mitigation actions and projects, with care taken to include those projects which can be considered reasonable and feasible based primarily on capacity, cost, and political feasibility. The high priority future mitigation actions include:

Hazard	Future Mitigation Actions
All-Hazards	Provide community information on preparation kits and Go-Bags.
Severe Heat	Maintain Library as emergency cooling shelter with generator and air-conditioning & improve Congregational Church as additional shelter.
Widespread Power Failure	Add generator capability to town library building, Maintain the back-up generator for the Town Office, Road building, and Fire Department.
Highway Accident	Request improvements to lines of sight at the high risk Doolittle Road-Route 22A intersection.
Structure Fire	Acquire compressor for refilling Self-Contained Breathing Apparatus tanks.
Invasive Species	Limit the spread of Poison Parsnip, Phragmites, and Emerald Ash Borer.
High Winds	Remove dead and dying trees from town rights-of-way.
Severe Cold	Maintain school gym as emergency heating shelter with generator.
Severe Snow Storm	Maintain snow removal equipment and qualified personnel.
Drought	Work with Tri-Town Water District on vulnerability assessment.
Flash Flooding & Fluvial Erosion	Include flood resiliency language in the current update of the Town Plan, Replace small (bridge) structure on Doolittle Road
Air Quality	Provide indoor shelter with filtered air systems.
Severe Ice Storm	Manage vegetation in Rights-of-Way to minimize/allow space for powerlines.
Insect-Borne Illness	Provide mosquito-safety educational materials on the use of appropriate repellants and behavior patterns which reduce the likelihood of mosquito bites.
Hazardous Materials Incident	Support HazMat training efforts of the Shoreham Volunteer Fire Department.
Infectious Disease Outbreak/Pandemic	Develop and maintain continuity planning and agreements for potential town staff shortages.
Hail Storm	Provide hail-safety education materials.
Wildfire	Require outdoor burn permits prior to any outdoor burning, support Shoreham Volunteer Fire Department wildfire training and equipment.
Lightning Storm	Provide lightning-safety and mitigation education materials.
Tornado	Encourage residents to sign up for VT-Alert to receive early weather warnings

A Hazard Mitigation Plan is dynamic and should not be static. To ensure that the plan remains current and relevant, it is important that it be updated periodically. The hazard mitigation plan should be reviewed by all new town officials and revised and updated in its entirety every 5 years.

The Town of Shoreham will monitor and evaluate its hazard mitigation goals, strategies and actions annually as the town budget is created. In updates of the Town Plan by the Planning Commission, the concepts, goals and strategies from this hazard mitigation plan should be incorporated and used to inform municipal development strategies.

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1. Planning Process

Requirement 44 CFR § 201.6(c)(1)
(Document the planning process)

1.1. Current Plan Development Process

The Town of Shoreham received a Hazard Mitigation Assistance grant from FEMA in 2022. The town issued a Requests for Proposals on September 14, 2022 and selected the Addison County Regional Planning Commission (ACRPC) as a consultant to update the Local Hazard Mitigation Plan and submit it to FEMA for approval.

The Town of Shoreham Selectboard confirmed their intent to work through the process of writing an All-Hazards Mitigation Plan. After the confirmation of funding availability, the Selectboard further showed their support of the plan by appointing the following residents of Shoreham to a mitigation planning committee:

- **Steve Goodrich**, Shoreham Selectboard and Emergency Management Director
- **Jason Paquette**, Shoreham Fire Chief and Road Foreman
- **Caroline Paske**, Shoreham Planning Commission
- **Laura Siebecker**, Shoreham Town Clerk
- **Sandy Korda,** Orwell EMD

The full committee met **May 28, 2025** to review the Hazard Mitigation Plan components and requirements and develop a strategy for outreach to public and other community stakeholders. At the following meeting on **XXX, 2025**, meeting, the committee completed a hazards inventory and risk assessment matrix to determine highest vulnerability hazards and locations. Following the February meeting, the committee reviewed Previous Hazard Mitigation Actions (from the 2018 plan) and posters were placed at Town Meeting Day for citizen input and feedback. ACRPC reached out to other Community Support organizations for additional feedback on the hazards inventory and risk assessment. The committee met again on **XXX, 2025** to set overall mitigation goals, review existing policies, programs and resources, and to develop potential mitigation projects associated with the hazards identified.

The final plan draft was sent to the Town Selectboard for their **April 8, 2026** regular meeting. Input on the draft plan was requested from the Town Selectboard and Planning Commission during open meetings. The town also made the plan available on its website https://www.shorehamvt.us/ to reach a broader distribution. A copy of the draft plan was sent via e-mail to the town clerks of the surrounding municipalities of Orwell, Bridport, Cornwall and Whiting for distribution to appropriate town officials on **April 2, 2026** with a request for review and edits by **May 1, 2026**. No comments were received.

Based on comments from the public process, the draft plan was further edited and forwarded to Vermont's State Hazard Mitigation Officer for comments and preliminary approval on **XXX XX 2026**. Suggested edits were identified by the SHMO on **XXX XX 2026**. Appropriate edits were made and the draft plan received tentative selectboard approval before being sent back to the SHMO for a second review before being passed on to FEMA reviewers. Comments were received back from FEMA reviewers on **XXX XX 2026**.

Changes were made to the draft plan based on FEMA recommendations and an updated draft was completed on **XXX XX 2026**. Upon completion of this draft, the plan was returned to FEMA for

Approval Pending Adoption (APA) status. Upon receipt of the FEMA APA, the resulting document was adopted by the Shoreham Selectboard on **XXX XX 2026**.

1.2. Opportunities for Public Involvement

Multiple opportunities for public comment were made available during the planning process:

- A planning committee was appointed from volunteers and town officers at an open meeting of the Town Selectboard.
- A set of posters with overview information about the Hazard Mitigation Plan and an interactive chart for communities to rank their own vulnerability priorities was displayed at Town Meeting, March 4, 2025 (Appendix 1)
- A copy of the draft plan was made available along with a comment sheet at the Town Office on April 2, 2026. The Town Clerk was asked to encourage the public to read and comment on the draft plan. (No comments received)
- Meetings of both the Town Selectboard and the Town Planning Commission were open for public comment throughout the planning and draft phases of this plan. (No comments received)
- Local stakeholder organizations were invited to attend during the initial hazard prioritization, during mitigation action prioritization, and again during plan revisions for feedback on hazard mitigation actions (Appendix 1).

Requirement 44 CFR § 201.6(b)(2) (Stakeholder Involvement)

1.3. Opportunities for Additional Comment

Additional opportunities for regional and state-level comments in the draft stage were provided throughout the planning process.

- A copy of the draft plan was posted on the ACRPC website www.acrpc.org for regional review and notice of its availability was given during the **April 2026** Addison County Regional Emergency Management Committee (REMC) meeting. Commissioners were asked to review and pass along comments to (Andrew L'Roe) at ACRPC. No comments received.
- The May 2025 ACRPC newsletter included an announcement that a draft plan was available for public review and comment. That draft was posted in the ACRPC office and was available for public input during normal business hours with a comment sheet attached. No comments received.
- The neighboring Town Clerks of Orwell, Bridport, Cornwall and Whiting were notified of the posting via e-mail on **May 2, 2026**. The clerks were instructed to share the notice with the select boards, planning commissions and the general public. Comments were requested to be sent to Andrew L'Roe at ACRPC. No comments were received.
- A copy of the draft plan was provided to the State Hazard Mitigation Office for comments on XXXXXXXDATE. Comments were received on XXXXXXXDATE
- An updated copy was sent to DEMHS for submission to FEMA on XXXXXXXDATE
- FEMA reviewers returned the draft plan XXXXXXXDATE for further edits which were completed and the edited plan sent back.

Requirement 44 CFR § 201.6(b)(3)
(Review of existing plans)

1.4. Extent of Review

Throughout the plan development process information from the following documents and sources were incorporated into the plan either as data or to inform the committee's prioritization process:

- 2025 Local Emergency Management Plan
- 2017 Shoreham Town Plan (support for the committee's prioritization process and section 2 narrative) and current Town Plan update in progress
- 2022 Addison County Regional Plan (Goals related to public safety as well as energy and transportation resilience) and current Regional Plan update in progress
- 2023 State of Vermont Hazard Mitigation Plan
- 2021-2023 reports of the State Fire Marshall (provided data to inform structure and wild fire risks)
- Federal Emergency Management Agency, www.fema.gov (provided official data on declared disasters)
- National Climatic Data Center website (provided information for Section 4.3)
- FEMA FIRMS dated 1985 (incorporated into maps)
- VT Center for Geographic Information data layers (incorporated into map products)
- State of Vermont Tier II reports, 2020-2024 (reviewed for Section 4.3)
- 23 Annual Town Reports 2013-2023
- Vermont Arbovirus Surveillance and Response Plan, updated in 2024
- NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/) for previous hazard occurrence

2. Local Background

2.1. Community Background

The Town of Shoreham makes up an area of about 46 square miles on the western edge of Addison County. Shoreham is primarily an open landscape of pasture and cropland punctuated with corridors of forest land and remnant woodlands or woodlots. Shoreham 's position on the Champlain valley floor and next to Lake Champlain substantially influences its climate. The western section of the town is only five miles from the eastern foothills (elevation 1000-2000' above sea-level) of the Adirondacks, and the eastern height of land is within 20 miles of the Green Mountains. Shoreham is bordered on the west by a deep section of the lake (120 to over 200 feet deep in sections), which is typically 3 to 5 miles wide at this point.

The moderating influence of Lake Champlain's warmer temperatures in fall keeps the valley floor more temperate, extending the growing season to over 150 days, which is almost a month longer than that of the upland areas of the state and spans from April to October in some years, adding to the areas' appeal as an agricultural setting. The United States Department of Agriculture Hardiness Zone Map (the map on which plant hardiness ratings are base) has put Shoreham in Zone 5, which has an average annual minimum temperature of between 15-20 degrees Fahrenheit.

Population

Shoreham, Vermont, has experienced modest population growth over the past two decades, continuing its transition from a primarily agricultural community to a more residential one. The town's population grew from 1,222 in 2000 to approximately 1,280 by 2023, reflecting a gradual increase after decades of more rapid growth in the late 20th century. Average household size has declined from 3.59 persons in 1970 to about 2.48 in 2010, consistent with statewide trends. While the number of housing units more than doubled between 1970 and 2010, recent growth has been slower, with new homes generally ranging from two to eight per year. Shoreham's demographic changes mirror shifts in employment patterns, as fewer residents work in agriculture and more commute or work remotely, while the community strives to maintain its rural character and scenic landscape.

Housing

Over the last two decades, Shoreham has experienced slow but steady housing growth, following a period of rapid expansion in the late 20th century when housing units more than doubled between 1970 and 2010. Recent development has been modest, with only two to eight new homes built annually, and most housing remains single-family residences dispersed along rural roads, with some higher-density areas in the village center and historic hamlets. Conversion of farmland into large-acreage residential lots has continued, raising concerns about impacts on agricultural soils and rural character. Looking ahead, Shoreham projects adding 63 housing units by 2030 and 236 units by 2050, with a focus on clustered development near existing infrastructure, mixed generational housing, and strategies to preserve open space while addressing affordability and sustainability needs.

Emergency Services

The Town of Shoreham annually updates a Local Emergency Management Plan (LEMP) to coordinate response to larger incidents. The Town's Select Board chair serves as Emergency Management Director. Shoreham's Library has been designated as an emergency shelter, and the town office as an emergency operations center.

Shoreham's emergency services are a mix of local volunteer-based and regional resources. Fire protection is handled by the Shoreham Fire Department, a municipal department operating from the Donald L. Treadway Firehouse, which houses fire trucks, rescue equipment, and road maintenance vehicles. Emergency medical services are delivered by the Shoreham First Response Squad, a volunteer non-profit funded through taxpayer allocations and private donations; this group provides on-site emergency care but does not transport patients. Police protection is provided by the Vermont State Police, as the Town does not maintain its own police department. Ambulance and hospital transport services are provided by Middlebury Regional Emergency and Medical Services (MREMS), with patients taken to Porter Medical Center in Middlebury or other regional hospitals as needed. Mutual aid agreements with neighboring towns help address staffing shortages and ensure adequate coverage during major incidents.

Social And Human Services

Shoreham residents have access to a variety of social and human service organizations, most of which are nonprofits located in Middlebury. Organizations including the Addison County Community Action Group, Addison County Home Health and Hospice, Tri-Valley Transit services, Champlain Valley Agency on Aging, the Counseling Service of Addison County, Elderly Services, Hospice Volunteer Services, the Open Door Clinic, Vermont Adult Learning and Atria Collective receive a small amount of funding annually from the town to support the services that are available to Shoreham residents.

Water Supply

The Tri-Town Water District serves a significant portion of the Town of Shoreham, as well as the neighboring town of Bridport as well as Addison. Tri-Town began operating in 1965. The system draws water from Lake Champlain at a facility in Addison. The system has a potential capacity of around two million gallons per day. The current maximum daily flow is around one million gallons per day. The district has two reservoirs; one in Addison that holds 625,000 gallons and another in Shoreham with a capacity of 750,000 gallons.

Electricity

Electricity is supplied to Shoreham by Green Mountain Power (GMP). GMP's main sources of electricity are market purchase, which are about 53%, and various large hydroprojects, which provide 23% of the total power. The remaining 26% is provided by new sources, such as solar, wind and others.

Communication

Shoreham's telecommunications infrastructure is primarily served by regional providers offering a mix of traditional and modern services. GoNet Speed delivers telephone, dial-up, DSL internet, and satellite TV to most of the town, while Champlain Valley Telephone serves residents in the northwest corner. Broadband access is available but limited in speed and coverage compared to urban areas, and improving connectivity remains a priority for supporting remote work and local businesses. Maple Broadband, the Addison County Communications Union District, is working to install high-speed fiber internet to much of Shoreham. some residents use Starlink for high-speed internet using their low earth orbit network. Cellular service is primarily available through Verizon, but can be inconsistent in some areas due to terrain and network limitations, making reliable coverage an ongoing concern for residents and emergency services.

Table. Community Assets

Category	Assets	Potential Hazard Vulnerabilities																			
		Widespread-Long term Power Outage	Severe Heat	Severe Cold	High Winds	Heavy Snow	Ice storm	Lightning Strikes	Drought	Infectious Disease Outbreak	Insect-borne Illness	Structure Fire	Fluvial Erosion	Inundation Flooding	Invasive Species	Highway Accident	HazMat Spill	Wildfire	Hail storm	Landslides	Earthquake
People																					
Underserved Communities	Older Residents	X	X	X		X	X			X	X										
	People with Disabilities	X	X	X		X	X			X	X										
	Families with Children	X	X	X		X	X			X	X										
	Unhoused Residents		X	X		X	X	X		X	X								X		
Socially Vulnerable Communities	Agricultural Workers		X	X						X	X						X				
	Short-term Visitors, AirBnBs	X	X	X		X	X	X		X	X										
Public Workers	Town Office Staff	X								X											
	Road Crew		X	X	X		X	X		X	X					X					
	Volunteer Fire Department		X	X	X		X	X		X		X				X	X	X			
	Volunteer First Response				X		X			X											
Structures	Wastewater Dept Staff																				
Facilities	Town Office											X					X				
	Town Library											X					X				
	Town Garage/Fire Department											X									
	USPS Post Office											X									
	Wastewater Plant																				
	School Building & Daycare											X									
	Community Center/Masonic Hall											X									
Lifelines	Private Water Wells								X								X				
	Cell Tower & Repeater				X			X				X									
	Mobil Gas Station											X				X	X				
	Shorewell Community Health											X				X	X				
Critical Infrastructure	Route 74 Bridge												X			X					
	Richville Rd Bridge												X			X					
	Iron Bridge												X								
	Route 22A															X	X				
	Route 74															X	X				
	Richville Road												X								
Future	Residential Buildings											X						X			

Community Assets		Potential Hazard Vulnerabilities																			
Category	**Assets**	Widespread-Long term Power Outage	Severe Heat	Severe Cold	High Winds	Heavy Snow	Ice storm	Lightning Strikes	Drought	Infectious Disease Outbreak	Insect-borne Illness	Structure Fire	Fluvial Erosion	Inundation Flooding	Invasive Species	Highway Accident	HazMat Spill	Wildfire	Hail storm	Landslides	Earthquake
Systems	TriTown Water Lines & Storage Tank								X												
	TriTown Pump Stations	X																			
	Dry Hydrants								X												
Networks	Powerlines	X			X	X	X														
Capabilities	Broadband Internet lines				X	X	X														
Natural, Historic, and Cultural Resources																					
Natural Resources	Trees and Forests						X		X						X			X			
	Lake Champlain								X						X						
	Cedar Swamp wetland								X									X			
	Rare & Threatened Species																				
	Richville Pond and Dam												X	X	X		X			X	
Economic Resources	Dairy Farms		X	X	X				X						X				X		
	Apple Orchards		X	X	X				X		X				X				X		
	PYO Farms		X	X	X	X			X	X	X										
	Beef Farms																				
	VT Refrigerated Storage															X	X				
	K. Pope Hauler															X	X				
	GoNetSpeed																				
	Halfway House											X				X	X				
Historic Resources	Shoreham Historical Society											X									
	East Shoreham Covered Bridge											X									
	Shoreham Inn											X									
Cultural Resources	First Congregational Church											X									
	St. Genevive Church											X									
Other Areas and Activities that have value to the community	Recreation Fields														X			X	X		
	Apple Fest				X			X	X	X	X							X	X		
	Roadway Bicycling		X		X			X								X		X	X		

Zoning Regulations
The town of Shoreham enforces a set of Unified Development Regulations, most recently adopted in 2024. The Town of Shoreham Unified Development Regulations are intended to provide for orderly community growth and to further the purposes established in the Shoreham Town Plan. The regulations require that dwellings comply with all applicable State and Federal health and safety regulations. Where these regulations impose a greater restriction upon the use of a structure or land than are required by any other statutes, ordinances, rules, regulation, permit, easement or agreement, the provisions of these regulations shall control.

The Zoning Regulations contain a set of Flood Hazard Area Regulations in order to promote the public health, safety, and general welfare, to prevent increases in flooding caused by the uncontrolled development of lands in areas of special flood hazard, and to minimize losses due to floods. These regulations apply to all lands in the Town of Shoreham identified as areas of special flood hazard on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), dated 1979, and any revisions.

The Development Review Board (DRB) and Planning Commission (PC) are responsible for establishing zoning regulations. The DRB reviews subdivision requests and decides on exceptions to those regulations in the form of variances and conditional and special use permits. The Zoning Administrator receives, reviews, and issues standard building applications, and may only issue a required Certificate of Compliance following inspection when a structure is completed.

Like most municipalities in Vermont, Shoreham does not have residential building codes that control how a building is constructed. NFIP compliance requires local policy that regulates where homes are built. Builders work with the designated building inspector and floodplain administrator in your community to document building code and NFIP compliance. The State of Vermont has adopted building codes for commercial building safety and energy standards

Land Use and Development Ordinances
Six distinct areas within the town have been identified with concomitant guidelines for future planning in these areas. These Zoning Districts include the:

Agricultural District (AG)- This district encompasses most of Shoreham's interior land, with little public road frontage. Land in this district is typically devoted to agricultural, forestry, and rural residential uses, and is vital to the Town's agricultural economy. This district provides the open space that gives Shoreham its rural character and scenic beauty. The district allows some rural small-scale development, but its primary purpose is to maintain a land base for working farms, forests, and open space. Construction of new non-farm structures, other than dwellings, is limited.

Low Density Residential District (LDR)- This district encompasses most of Shoreham's road and lake frontage, to a depth of 500′ from road centers, on both sides of all roads. Along the lakeshore the LDR reaches 500′ inland from the mean high-water mark. In order to keep development at a level compatible with Shoreham's rural character a 200 foot lot frontage minimum is required along road or lakeshore.

Medium Density Residential District (MDR)- This district is comprised primarily of the Torrey Island region and the area by the Lapham Bay State Fishing Access. The MDR reaches inland from the Lake's mean high-water mark for distances ranging from about 1000′ at the Bridport line, to roughly 200′ along Fifield Lane. Lands within this district generally have limitations for on-site sewage disposal and are served mainly by private access roads. Torrey Island is composed of leased lots, all of which are owned by the Torrey Estate, and leased out on a multi-year basis. The dwellings and other structures are owned by the renters. Lots are typically far less than the 1-acre requirement and fail to meet the majority of dimensional requirements for the LDR. They are handled as nonconformities for zoning purposes. New development should be limited by soil suitability for onsite sewage disposal. Secondary Housing Units are not allowed. Provisions of the Special Flood Hazard Area may apply.

Village Commercial District (VCD)- This district includes land lying predominantly along Rte. 22A, near the historic village settlement, which has access to the municipal wastewater system, Tri-Town water, highspeed Internet, and three-phase power. Shoreham has been given the "Village Center" designation by the State of Vermont. This district is adjacent to the Village Residential District and is intended to accommodate higher density Mixed-Use development, in which commercial uses predominate, while maintaining or extending historic patterns of development. Commercial strip development is specifically discouraged.

Village Residential District (VRD)- This zoning district includes land which is served by municipal water and wastewater systems, and represents Shoreham's historic village settlement. Shoreham has been given the "Village Center" designation by the State of Vermont. This district is intended to accommodate higher density mixed-use development in which residential uses predominate. The object is to maintain the existing village center, village character, and historic patterns of development.

Village Park District (VPD)- This district constitutes an unimproved parcel of land that the Town of Shoreham has reserved for the use and enjoyment of residents and guests of the Town of Shoreham for recreational purposes. The VPD lies adjacent to, and within easy walking distance of, most of the Village. This district consists of municipally-owned land with severe physical limitations for development. It is located parallel to the west side of VT Rte. 22A, between the Rte. 22A/Rte. 74W and slightly north of the Rte. 22A/Rte. 74E junctions.

Special Flood Hazard Area District (SFHA)- This district includes all lands in the Town of Shoreham identified as areas of Special Flood Hazard on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) as most recently revised. It is the purpose of this district to: 1. Prevent increases in flooding caused by uncontrolled development of lands in areas of special flood hazard; 2. Minimize losses due to floods by restricting or prohibiting uses that are dangerous to health, safety, or property in times of flood or cause measurable increases in flood heights or velocities; 3. Require that uses which are vulnerable to floods, including the public facilities that serve such uses, are protected against flood damage at the time of initial construction; and 4. Enable property owners to obtain flood insurance through the National Flood Insurance Program (NFIP). Only Agricultural, Recreational, and certain Residential Accessory Uses are permitted, with several restrictions.

Requirement 44 CFR § 201.6(c)(3)(ii)
(NFIP Participation and Compliance)

Future Development
According to VHFA's Housing Needs Assessment, to accommodate projected household growth and meet other current housing market needs, Vermont is likely to need to expand its total housing stock by 79,000-172,000 homes by 2050.

Addison County Regional Planning Commission has been working with the town of Shoreham to update its Town Plan and Future Land Use planning areas. ACRPC has adopted the goal of achieving statewide housing development targets and developed estimated housing targets at the county and municipal level to meet these goals. Under this calculation, Shoreham has been assigned a goal of 63 additional housing units by 2030, and 236 additional housing units by 2050. The housing is expected to occur primarily within the Village Area and expanded Planned Growth Area, with the remainder in rural low, medium and agricultural district as currently allowed by municipal zoning.

Shoreham is taking steps to keep its village center vibrant, provide homes for its aging population and young families, attract new business and maintain basic services for the community. The town currently owns a 310-acre parcel, known as the Farnham property, its southern portion abutting the village main street. and the northern portion of the property extending to the Shoreham Cedar Swamp.

Aerial view of Farnham property, October 2025

Shoreham plans to use the town-owned Farnham property to expand housing opportunities within the village, focusing development in the southern portion of the parcel where soils, slopes, and infrastructure are most favorable. The master plan envisions a mix of housing types to meet current needs, including multifamily and multigenerational affordable units (Zone 1A), clustered single-family workforce homes (Zone 1B), a variety of clustered market-rate homes (Zone 2), and larger-lot single-family market-rate houses (Zone 3). Future development aims to support seniors, young families, and workforce residents through diverse formats such as rentals, owner-occupied units, cohousing, and tiny homes, all integrated with open space, trails, and community amenities. Shoreham's Village Residential zoning allows for approximately one housing unit per 0.5 acres, and the Village Center designation provides tax credit and grant opportunities to help advance these housing goals.

2.2. Community Maps

2.2.1. Municipal Road Names Map

2.2.2. Population Density Map

2.2.3 Community Facilities Map

2.2.4. All-Hazards Planning Map

2.2.5. Flood Resiliency Map

2.2.6. Vehicle Crash Location Map

2.2.7. New Development (2010-2026) Map

2.2.8. Future Land Use Map

3. Existing Adopted Plans Which Support Hazard Mitigation

3.1. 2025 Shoreham Local Emergency Management Plan

Adopted annually and before May 1st each year and includes all required elements:

- Emergency Management (EM) Planners
- Municipal Emergency Operations Center (EOC)
- Municipal Resources
- Public Information and Warning
- Vulnerable Populations
- Shelters
- Local and Regional Contacts

3.2. 2016 Shoreham Municipal Plan and Land Use Plan Goals

The Guiding Principles behind this Plan are:

· To safeguard the general health, safety, and economic well-being of Shoreham's residents.
· To provide a means to anticipate and deal with environmental hazards.

Section: COMMUNITY FACILITIES AND SERVICES
GOAL 1: Develop a safer road system that minimizes conflict between motorized and non-motorized forms of transportation.

3.3. 2018 Addison County Regional Plan

Goals that support hazard mitigation:

- Work to restore and maintain stream equilibrium by developing and implementing river corridor plans.
- Reduce flooding and related damages through appropriate mitigation techniques.
- Encourage watershed-based cooperation and educate towns and the general public about water quality and stream dynamics
- Provide communities the support they need to be proactive in reducing flood and erosion hazards by adopting appropriate zoning regulations to limit development in hazardous areas.
- Encourage proper maintenance and sizing of bridges, culverts and other structures to accommodate flow from storm events and to mitigate flood hazards.
- Reduce the loss of life and injury resulting from all hazards.
- Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.
- Reduce the damage to public infrastructure resulting from all hazards.
- Recognize the connections between land use, storm-water, road design/ maintenance and the effects from disasters.
- Ensure that mitigation measures are sympathetic to the natural features of the region's rivers, streams and other surface waters; historic resources; character of neighborhoods; and the capacity of the community to implement them.
- Encourage hazard mitigation planning as a part of the Municipal Planning Process.
- Encourage municipalities and landowners to consider VT Agency of Natural Resources riparian guidelines for habitat and flood protection.

3.4. 2018 Addison County Regional Plan

Goals

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.

Priority Plan Actions:

Utilizing existing FEMA mapping updates and the Functioning Floodplain Initiative, develop an inventory of critical headwater and floodplain storage areas that would result in a measurable abatement of flooding.
Develop a drought plan for Vermont to include analyzing water level/monitoring data to use as predictor of drought and rates of recovery.
Develop a wildfire mitigation plan, to include research on the long-term future risk of wildfire due to climate change, determine existing infrastructure for wildfire suppression, and develop wildfire mitigation options.
Support municipalities in developing a prioritized list of transportation infrastructure improvements that increase resilience using PROTECT and/or other funding sources.
Increase Public Service Department capacity to maximize utilization of available federal dollars (including IIJA, IRA, ARPA, and EDA) towards utility resilience implementation work.
Assess all state/federal funding/technical assistance programs, as well as State permitting programs, to determine areas for better alignment around state hazard mitigation priorities.
Identify sustainable, long-term funding to support hazard mitigation and local match, to include: purchase of hazard-prone properties and easements to conserve river corridors, floodplains, and wetlands identified as key flood attenuation areas.
Complete an assessment of heat risks in urban areas of Vermont and expected impacts on historically disadvantaged populations, identify strategies for mitigating impacts (e.g., urban forestry, green roofs, green infrastructure, and/or other vegetative strategies; increased use of highly reflective and/or high emittance materials for pavement, roofs, and building).
Develop a methodology and protocol for quantifying climate mitigation, resilience, and adaptation impacts (Climate Action Office measuring and assessing progress tool).
Develop an analysis of existing Resilience Hub locations, including identification of new locations, and identification of key components that should be co-located within a Resilience Hub.

4. Community Risk Assessment

Requirement 44 CFR § 201.6(c)(2)(i)
(Description of all natural hazards)

4.1. Risk Prioritization Process

The Town of Shoreham's Hazard Mitigation Planning Committee reviewed the following hazards in its Hazard Inventory/Risk Assessment, examining each of the 2018 State Hazard Mitigation Plan assessed hazards:

- Inundation Flooding,
- Fluvial Erosion
- Severe Snow Storm
- Ice Storm
- Tornado or High Winds
- Severe Cold
- Invasive Species
- Landslides
- Wildfire
- Drought
- Hail
- Infectious Disease outbreak
- Severe Heat
- Earthquake
- Dam Failure

While completely human-caused hazards were removed in the most recent State of Vermont's 2023 hazard mitigation plan, the Shoreham committee felt that additional hazards should be included in the assessment due to community concerns and potential impacts:

- Widespread Power Failure
- Structure Fire
- Highway Accident
- Large-Scale Hazardous Materials Incident

The Shoreham Hazard Mitigation Planning Committee then assessed the town's vulnerability to each hazard for each of the following factors:

- **Probability,** or likely frequency of occurrence from historical trends and future projections
- **Warning**, or the projected time available to give notice to the majority of the population
- **Geographic impacts**, or how much of the population is expected to be impacted
- **Potential impacts**, or the potential severity of damages and disruption to lives and property.

Overall Vulnerability was then calculated by taking the total score of Warning, Geographic Impact, and Property Damage and multiplied by Probability. This score was divided by 4 to increase the scoring legibility and rank hazards on a 12-point scale.

In an effort to validate the risk assessment completed by the Steering Committee, community input was solicited through both an online survey and interactive display at Town Meeting Day to solicit input. The priority scores indicated by community members were very similar to those determined by the steering committee and comments supported including the additional hazards (See **Appendix 1**).

4.1.1 Hazard Inventory/Risk Assessment Parameters

Probability: Frequency of Occurrence

1= Unlikely	<1% in a given year
2= Occasionally	1%-10% probability in a given year
3= Likely	>10% but <100% in any given year
4= Highly Likely	100% probability in a given year

Warning: Time available to give notice to the majority of the population

1= More than 12 hours
2= 6-12 Hours
3= 3-6 hours
4= <3 hours (minimal)

Geographic Impacts: How much of the population is expected to be impacted

1= Isolated Locations/neighborhood	<20% of population impacted
2= Moderate impact	>20% and <75% of population impacted
3= Community-wide	>75% of population impacted within community
4= Region-wide	Level 2 & 3 impacts in surrounding communities

Potential Impact: Severity of damages and disruption to lives and property

1= Negligible	Isolated property damage, minimal disruption to infrastructure
2= Minor	Isolated moderate to severe property damage, brief disruption to infrastructure
3= Moderate	Severe damages at neighborhood level, temporary closure of infrastructure
4= Major	Severe damages town-wide, temporary to long-term closure of infrastructure

Vulnerability: Total score of Warning, Geographic Impact, and Property Damage, multiplied by Probability (and divided by 4 to increase legibility of scale)

Community Priority:

Highest Priority	Vulnerability score > 6
High Priority	Vulnerability score > 4 and ≤ 6
Moderate Priority	Vulnerability score > 3 and < 4
Low Priority	Vulnerability score ≤ 3

4.1.2 Town of Shoreham Risk Assessment Results 2025

Hazard	Hazard Impact	Potential Occurrence Location	Probability	Warning Time	Geographic Extent	Potential Impact (to life, property, and/or environment)	Committee/ Community Concern	2025 Scoring
			1 (Low)- 4 (High)	1 (Well in advance)- 4 (Minimal)	1 (Isolated)- 4 (Broad)	1 (Minor) - 4 (Major)	1 (Minor) - 4 (Major)	
Severe Heat	Human Health Risk	Whole town	4	2	4	3	4	**9.00**
Widespread Power Failure	Health Risk, property damage	Whole town, northeast corner on separate circuit	3	4	4	3	3	**8.25**
Highway Accident	Human injury, property damage	Along state roads and major town roads	4	4	1	3	3	**8.00**
Structure Fire	Property Damage, Health Risks	Individual Structures	4	4	1	3	3	**8.00**
Invasive Species	Property Damage, Health Risks	Whole town	4	1	4	3	3	**8.00**
High Winds	Property Damage and Power Outage	Whole town, western exposures	3	2	4	3	3	**6.75**
Severe Cold	Human Health Risk	Whole town	3	2	4	3	3.5	**6.75**
Severe Snow Storm	Closed Roads, Property Damage and Power Outage	Whole town, drifting on East-West Roads	3	2	4	3	2.5	**6.75**
Drought	Loss of Drinking Water, Crop damage	Farms and Residences served by private wells	3	1	4	3	3	**6.00**
Flash Flooding & Fluvial Erosion	Property damage and road closure	Areas immediately adjacent to rivers and streams,	3	3	2	3	3	**6.00**
Air Quality	Human Health Risk	Whole town	3	1	4	3	3	**6.00**

Hazard	Hazard Impact	Potential Occurrence Location	Probability	Warning Time	Geographic Extent	Potential Impact	Committee/ Community Concern	2025 Scoring
Severe Ice Storm	Property Damage and Power Outage	Whole town	3	1	4	2	2	**5.25**
Insect-borne Illness	Human Health Risk	Whole town, especially wetlands and forested areas	3	1	4	2	3	**5.25**
Large-Scale Hazardous Materials Incident	Human Health risk/contamination	Along major roads and Tier II sites	2	4	3	3	2	**5.00**
Infectious Disease Outbreak	Human Health Risk	Whole town	2	1	4	4	4	**4.50**
Hail Storm	Property and Crop Damage	Any part of town	3	3	1	2	3	**4.50**
Wildfire	Structure Fires and Property Damage, Air throughout town	Residential areas with wetland and grassland	2	4	1.5	3	3	**4.25**
Lightning Storm	Fire Damage	High structures and ridges	3	2	1	2	2	**3.75**
Tornado	Property Damage and Power Outage	Any part of town	2	3	1	3	2	**3.50**
Landslides	Road & Power infrastructure damage, Property damage	Steep slopes, Palmer Road	2	2	1	2	1	**2.50**
Earthquake	Structure and Property Damage	Whole town	1	4	4	2	1	**2.50**
Inundation Flooding	Water Damage	Low-lying Areas adjacent to the Lemon Fair River and Lake Champlain	2	1	1	2.5	3	**2.25**
Dam Failure	Property damage, road closure	Richville Dam	1	2	1	2	1	**1.25**

4.2. Risk Prioritization Results

The committee calculated the following hazards as the highest in terms of overall vulnerability

- Severe Heat
- Widespread Power Failure
- Highway Accident
- Structure Fire
- Invasive Species

Six additional hazards received a High vulnerability score:

- High Winds
- Severe Cold
- Severe Snow Storm
- Drought
- Flash Flooding & Fluvial Erosion
- Air Quality

Eight additional hazards received a Moderate vulnerability score:

- Severe Ice Storm
- Insect-borne Illness
- Large-Scale Hazardous Materials Incident
- Infectious Disease Outbreak-Pandemic
- Hail Storm
- Wildfire
- Lightning Storm
- Tornado

Four additional hazards received a Low vulnerability score:

- Landslide
- Earthquake
- Inundation Flooding
- Dam Failure

4.3 Hazards: Location, Extent, Previous Occurrences, Future Probability and Vulnerability

Addison County has experienced more than a dozen federally-declared disasters over the past decades (see Figure 1 and Table 1). Most of these have been due to severe storms and associated flooding.

The Town of Shoreham has avoided most of the physical effects and financial damage of these disaster events. The costliest storm events were flooding in spring 2011 (months prior to Tropical Storm Irene), and a snowstorm in March 2001. The town received some public assistance following these events, but the individual assistance damage threshold was not met.

Figure 1. Federally Declared Disasters in Vermont by County, 2003-2025

Table 1. Federally declared disasters and costs affecting Addison County and Town of Shoreham

Year	Incident Date	Description	Declaration #	County Cost
2024	July 29- 31, 2024	Severe Storms, Flooding, Landslides, and Mudslides	DR4826	Unavailable
2024	July 9 - 11, 2024	Severe Storm, Flooding, Landslides, and Mudslides	DR4810	Unavailable
2023	August 3 -5, 2023	Severe Storms and Flooding	DR4744	Unavailable
2023	Jul 7- 21, 2023	Severe Storms, Flooding, Landslides, and Mudslides	DR4720	Unavailable
2022	Dec 22- 24, 2022	Severe Storms and Flooding	DR4695	Unavailable
2021	July 29 - July 30, 2021	Severe Storms and Flooding	DR4621	Unavailable
2020	Jan 20, 2020 - May 11, 2023	Vermont COVID -19 Pandemic	DR4532	Unavailable
2019	April 15, 2019	Severe Storms and Flooding	DR4445	Unavailable
2019	October 31- November 1, 2019	Severe Storms and Flooding	DR4474	Unavailable
2017	Oct 29 - Oct 30, 2017	Severe Storms and Flooding	DR4356	Unavailable
2017	June 29 - Jul 1, 2017	Severe Storms and Flooding	DR4330	Unavailable
2015	June 9, 2015	Severe Storms and Flooding	DR4232	$893,310.63
2015	December 9 - 12, 2014	Severe Winter Storms	DR4207	$184,715.05
2012	May 29, 2012	Severe Storm, Tornado and Flooding	DR4066	$172,847.70
2011	August 26-September 2, 2011	Hurricane Irene	EM3338	Unavailable
2011	August 27-9/2/2011	Tropical Storm Irene	DR4022	$1,175,911.20
2011	April 23- May 9, 2011	Severe Storms and Flooding	DR1995	Unavailable
2008	June 14-17, 2008	Severe Storms and Flooding	DR1778	$1,114,515.70
2008	July 21-August 12, 2008	Severe Storms and Flooding	DR1790	$2,273,481.42
2004	August 12- September 12, 2004	Severe Storms and Flooding	DR1559	$430,551.00
2001	March 5-7, 2001	Snowstorm	EM3167	$138,333.08
2000	July 14-18, 2000	Severe Storms and Flooding	DR1336	$738,127.27
1998	January 6-16, 1998	Ice Storms	DR1201	$662,388
1998	July 17-August 17, 1998	Severe Storms and Flooding	DR1228	$2,146,484
1996	January 19- February 2, 1996	Storms, Flooding	DR1101	$130,529
1993	April 24- May 26, 1993	Flooding, Heavy Rain, Snowfall	DR990	$17,639
1989	August 4-5, 1989	Severe Storms, Flooding	DR840	$31,033
1977	September 6, 1977	Drought	EM3053	$ Unavailable
1976	August 5, 1976	Severe Storms, High Winds, Flooding	DR518	$ Unavailable
1973	July 6, 1973	Severe Storms, Flooding, Landslides	DR397	$ Unavailable

Each of the hazard types have been identified, evaluated and listed in order of priority as identified by the Shoreham Hazard Mitigation Committee as shown in their risk assessment. Other hazards identified in Vermont's state hazard mitigation plan did not rise to the same level of concern by the local planning committee. Hazard types are listed in their order of priority with highest perceived vulnerability described first.

Requirement 44 CFR § 201.6(c)(2)(i)
(Hazard information- Location, Extent, Previous Occurrences)
Requirement 44 CFR § 201.6(c)(2)(ii)
(Hazard Impacts, Vulnerability)
Requirement 44 CFR § 201.6(c)(d)(3)
(Development in hazard-prone areas)

Two hazards that received a Low vulnerability score and were judged to have little or no probability of occurring were not evaluated. These included Earthquake and Dam Failure.

4.3.1 Severe Heat (Vulnerability Score 9.00)

The frequency and intensity of hot weather is increasing in Vermont, resulting in greater numbers of heat-related emergency department visits and total deaths.

Location:

Heat waves occur across the entire state, but may be a slightly higher risk in areas like Shoreham that aren't higher elevation mountain locations but also aren't close to Lake Champlain with cooling on-shore and off-shore breezes.

Extent:

A number of metrics demonstrate the extent of recent increase across the state:

- Days with a maximum temperature above 95 degrees Fahrenheit have increased from less than 1 per year (1950-2009) to at least 2 per year (2010-2022)
- Days with a maximum temperature above 90 degrees Fahrenheit have increased from about 4 per year (1950-2009) to more than 9 per year (2010-2022)
- Days with a minimum temperature above 70 degrees Fahrenheit have increased from about 2 per year (1950-2009) to more than 7 per year (2010-2022)

Previous Occurrences:

Since 1970 across western Addison County, NOAA has seven documented heat events, primarily during July and August and all since the year 2006:

	January	February	March	April	May	June	July	August	September	October	November	December
Heat Event	0	0	1	0	0	1	3	2	0	0	0	0

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

The March 2012 event saw record heat across all of Vermont with maximum temperatures 30° to 40° above normal. Some daily records that stood for more than 100 years were broken and several daily records were broken by 10° or more. The Winter of 2011-12 was atypical with temperatures that averaged 4°-5° above normal and snowfall that was 40-60 percent lower than normal. This combination caused snowpacks across the region to be well below normal or even non-existent by mid-March. The ski industry suffered significant revenue loss due to lack of snow, including early spring closures and the Vermont maple sugaring industry lost approximately $10M statewide.

From June 18-23, 2020 the second longest heatwave in modern history (1900-onward) occurred across portions of New York and Vermont. Temperatures exceeded 90° F for up to six consecutive days in portions of the Champlain Valley.

Future Probability:

Average temperatures in Vermont are projected to increase by an additional 3° to 12° F by 2100, suggesting that Shoreham can expect more frequent and harmful hot weather in the future. A number of NOAA projections demonstrate the probability of future temperature increases in the Champlain Valley:

- Days with a maximum temperature **above 95 degrees** Fahrenheit will increase from 2 per year (2010-2022) to **between 3 and 6 per year** (2035-2064)
- Days with a maximum temperature **above 90 degrees** Fahrenheit will increase from 9 per year (2010-2022) to **between 13 and 19 per year** (2035-2064)

Vulnerability:

Changes in climate are expected to increase the probability of Severe Heat incidents and changes in land use and population may increase their impact on community assets or the population.

Despite Vermont's northern location, data indicates that Vermont residents experience heat-related illnesses at lower temperatures than residents of other regions. This is likely related to the infrequency of hot weather in Vermont, which has several impacts:

• Vermonters do not experience enough hot weather for their bodies to adapt to hotter conditions;

• Many Vermont homes are not adequately weatherized and do not have air conditioning;

• The State and local communities have not developed plans and policies needed to be prepared for hot weather;

• Adapting behaviors to stay safe during hot weather can be challenging for individuals;

• Vermont has a large population of older adults, who are at higher risk for heat-related illnesses.

The Vermont Department of Health has identified Shoreham as having a higher population vulnerability than the state average, due primarily to the percentage of "Adults 65 and Older Living Alone" in Shoreham. Other populations disproportionately impacted by heat can include outdoor workers and hobbyists with more exposure to hot conditions, populations that are particularly sensitive to heat exposure (older adults, young children, pregnant women, people that are overweight or have chronic medical conditions, people using drugs, alcohol, or some prescription medicines), and people with limited adaptation resources (living alone, unable to access community cooling sites, or unable to keep their home cool).

Between 2009 and 2019, there were an average of 104 heat-related emergency department visits per year and 12 heat-related deaths across the state. The primary shelter for Shoreham, the town office, currently has no way to provide cooling.

Severe heat events are considered a **HIGHEST PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 9.00 determined

4.3.2 Widespread Power Failure (Vulnerability Score 8.25)

Location:

Shoreham's electricity is provided by Green Mountain Power, with nearly all of the town supplied by the substation in Leicester and line across Otter Creek. The north-eastern portion of town is supplied by a substation in East Middlebury and line across Otter Creek at Piper Crossing. Both substation transformers have less than 10% capacity remaining.

Extent:

Nearly all residences and public buildings in Shoreham rely on electricity provided by the Green Mountain Power utility. An increasing number of residents have residential solar production, home-battery storage, or generator backups that can allow them to maintain power for extended periods.

Previous Occurrences:

On December 22-23, 2022, Addison County received high winds, downing power lines and closing roads, followed by cascading temperatures falling into the single digits, with wind chills of zero to the minus 0's. The greatest effect to Shoreham was the extended power outage following the storm.

In January 2024, heavy winds from an intense winter storm downed trees and damaged utility lines throughout the region, leaving more than 4,000 residents in Addison County without power, and an estimated 12,595 Vermonters without power in 72 towns throughout the state.

Power outages in August 2023 due to Tropical Depression Debby, when more than 50,000 residences across Vermont lost power due to high winds, were relatively minor in Shoreham and Addison County. Nearly all residents that lost power regained it within 36 hours.

Future Probability:

Future power outages due to wind-storms and heavy snowfall are likely to continue and may increase with more frequent with higher precipitation amounts in all seasons and higher wind speeds, leading to more risk for infrastructure and more outages for utility customers. Green Mountain Power has been working to make their electrical systems more resilient and are working towards a 0-outages goal. Their projects to implement a resilient energy system include:

- Undergrounding lines (doing undergrounding work on the 20 most unreliable circuits, burying power conduit/cable/telephone lines at depth of 51 inches). GMP tries to stay in existing right of ways off-road to avoid roads, but in some areas the only flat place that they can bury lines is the road and they work with towns to minimize disturbance.
- Storm hardening above ground lines (spacer-cables in diamond shape), and
- Creating additional energy storage, including home battery storage

Figure. Screenshot from Green Mountain Power's online Outage Map on December 22, 2023

GMP monitors forecasters and weather models days in advance of any storm, and do outreach before, during, and after storms, with regional and local updates to state and local officials. They do targeted updates by email and phone for customers on their critical care list.
They secure and pre-position GMP teams, and extra crews are brought in to help as needed
They distribute resources to the hardest hit areas and have districts run storm response in their area for efficiency.

Vulnerability:

Future assets are not expected to experience increases in vulnerability to extended power outages due to land use changes, but may increase with changes in population demographics

Widespread power failure events are considered a **HIGHEST PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 8.25 determined.

4.3.3 Highway Accident (Vulnerability Score 8.00)

Location:

Since 2015, there have been more than 120 car accidents documented by state police within the town of Shoreham. Most of these have been on the primary state routes through town, on Route 22A (47%), Route 74 (7%). The intersections of Doolittle Rd and Route 22A were areas of high numbers of crashes, though most of these were due to cars being rear-ended.

Figure. VTrans Recorded Shoreham Accident locations, 2015-2026

Extent:

Most accidents occurred during daylight hours (60%) and in clear weather, though freezing precipitation was the weather condition in 20% of crashes. The majority of crashes were single vehicle accidents with most resulting only in property damage, with no fatalities, though more than 40 (47%) resulted in injuries. At least 16 (13.2%) involved Heavy Trucks, and most were sideswipes.

Previous Occurrences:

Car accidents in Shoreham have averaged 1 or 2 per month, with slightly higher rates in the winter months, but declining overall in recent years.

Figure. Car crashes by Year

Figure. Car crashes by Month

<u>Future Probability:</u>
While documented car accidents over time have declined in recent years, through-traffic may have increased, potentially due to commuters and travelers. Traffic calming measures, such as road widening and other safety engineering, should help reduce speeding and accidents.

<u>Vulnerability:</u>
Changes in climate are not expected to increase the probability of Highway Accidents or affect their impact on community assets or the population.

Highway accidents are considered a **HIGHEST PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 8.00 determined.

4.3.4 Structure Fire (Vulnerability Score 8.00)

Location:
Nationwide, civilian fatalities are correlated with populations living in rural areas and in older homes. As with much of Vermont, Shoreham's housing stock is dominated by older, owner-occupied residential homes, which account for most structure fires. While multi-building fires are unlikely, given the dispersed geography of the town's structures, response time is extended. Access issues on narrow driveways could also cause challenges, especially with multiple departments and the need to coordinate a continuous stream of water tankers to deliver the needed volume for fire suppression in areas without a municipal water system.
Shoreham's supports its own volunteer fire department for fire-response coverage, as well as motor vehicle accidents and a number of other types of emergency calls.

Extent:
The primary causes of structure fires are cooking fires and heating appliances, especially wood stoves and uncleaned creosote from solid-fueled heating equipment chimneys. Aging houses and cold Vermont winters put added stress on heating systems. Furthermore, the high cost of heating fuel can force people to use alternative heating sources that may not be safe. An improperly installed and maintained heating appliance can result in added fire risk and carbon monoxide poisoning. While fatalities from fires are rare, older adults have a greater risk of fire death than the overall population.

Previous Occurrences:
In the last decade, only a small number of emergency calls in Shoreham were for structure fires. However, structure fires do occur every year or two. Several significant fires have occurred over the last decade. On July 20, 2020 a structure fire at 138 Elmendorf Road killed the 85-year old homeowner.

In 2010 a fire, sparked by a lightning strike, destroyed 200-year-old Newton Academy building that housed a preschool and medical clinic.

The elegant United States Hotel, established at Larrabee's Point circa 1840 and lost to fire in 1917, was a major symbol of the once flourishing commercial and popular recreational enterprises along the Vermont lakeshore.

Future Probability:
The risk of individual structure fire events is likely to continue. Education about safe practices and maintenance activities will prevent some incidents, but accidents and unforeseen occurrences will occur. Changes in climate, land use, and population are not expected to increase the probability of Structure Fires or affect their impact on community assets or the population.

Vulnerability Summary:

Older adults have a greater risk of fire death than the overall population. In the past decade, more than a third of Vermont's fire deaths have been seniors over the age of 65. About 21% of Shoreham's population is older than 65, about the same as the rest of Addison County and Vermont. Future assets are not expected to experience increases in vulnerability to structure fires due to land use changes or change in population demographics.

Structure fires are considered a **HIGHEST PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 8.00 determined.

4.3.5 Invasive Species (Vulnerability Score 8.00)

Invasive species are non-native introductions to an ecosystem whose presence causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can overwhelm native species and their habitats, forcing the native species out due to their ability to outcompete native species in their natural environments without the threat of a predator that can keep their populations in check. Invasive species are considered the second greatest threat to global biodiversity.

The State of Vermont has a long history of invasive species infestation in several categories, including:

Aquatic Species

- Zebra Mussel
- Eurasian and Variable-Leaf Watermilfoil
- Water Chestnut

Forest Pests

- Emerald Ash Borer
- Hemlock Woolly Adelgid*
- Asian Long-horned Beetle*

Arbovirus-Transmitting Arthropods

- Asian Tiger Mosquito (*Aedes albopictus*)*
- Asian Longhorned tick*

Disruptive Terrestrial Plants

- Japanese Knotweed
- Common Reed (Phragmites)
- Purple Loosestrife
- Garlic Mustard
- Buckthorn

Phototoxic Terrestrial Plants

- Giant Hogweed
- Wild Parsnip
- Wild Chervil

Tick Increasing Plants

- Japanese Honeysuckle
- Japanese Barberry

*Not yet present in Addison County

Aquatic Invasive Species pose a serious threat to lakes, ponds, and rivers by choking out swimming holes and crowding out beneficial native species,
drastically impacting aquatic foodwebs and limiting fishing, or covering lake bottoms with a layer of sharp shells.

Forest Pests are insects that cause irreversible impacts on tree health and biodiversity.

Arbovirus-Transmitting Arthropods are a group of insects that transmit viral infections through their bites.

Disruptive Terrestrial Plants are invasive plants can change soil composition, change water tables, and disrupt insect cycles, negatively affecting native plant regeneration, agricultural crops, ecosystem function, recreation and wildlife habitat, and human health.

Phototoxic Terrestrial Plants are invasive plants whose sap can cause a chemical reaction that makes skin hypersensitive to ultraviolet sunlight if it makes direct contact with human skin and potentially cause serious skin burns.

Tick Increasing Plants are plants have proven to increase the incidence of Lyme disease by providing sheltered habitat that increases the abundance of small rodents, which act as hosts to the ticks that carry Lyme disease pathogens.

Location:

Invasive species are commonly introduced via travel routes, unintentionally brought into Vermont with the transportation of people and goods. As a result, many are found along roadsides and in waterways across the entire state. Aquatic Species have become established in Otter Creek (Water Chestnut).

Shoreham contains relatively little forest cover susceptible to Forest Pest insects, in comparison to neighboring municipalities. Shoreham's largest forest blocks are located in the Shoreham Swamp, and the ledge areas east of Route 22A. Large trees on the adjacent to Route 74 and other trees along other roads and driveways in town could be impacted. Shoreham is within the five mile "confirmed infested areas" of confirmed Emerald Ash Borer locations in Middlebury and Bristol.

Phototoxic Terrestrial Plants like Wild Parsnip are especially common in abandoned yards, farmland, and along roadsides and other disturbed environments. They spread by seed via waterways, wind, mowers, and wildlife.

Common Reed (*Phragmites australis*) creates dense monocultures in wetlands, especially Shoreham Swamp, and spreads rapidly along highways and shorelines.

Extent:

Invasive species have a variety of effects on humans and the environment so characterizing the extent of their spread is a challenge.

Forest Pest insects threaten more than 14 different species of trees in Vermont, including: maple, elm, horse chestnut, willow, ash, poplar, European mountain ash, hackberry, and hemlock.

Wild Parsnip secretes a toxic sap that contains furanocoumarins, chemicals that make the skin extremely sensitive to ultraviolet (UV) rays. The toxic sap, in combination with sun exposure, can cause a severe skin reaction called phytophotodermatitis, which usually starts within 24 to 48 hours of exposure. The reaction can turn into a severe rash or blistering burn and lead to discoloration of the skin or photosensitivity that can last for years.

Phragmites (*Phragmites australis*), or Common Reed, is a highly aggressive, non-native wetland grass found across Vermont that creates dense monocultures, choking out native plants and ruining wildlife habitat. These tall (up to 15-20 ft) plants spread via seeds and rhizomes, disrupting ecosystems and altering wetland hydrology. Control requires a multi-year effort combining cutting below the water line or using herbicide applications. The plant creates a thick accumulation of dead biomass that can produce high-intensity fires, threatening structures near wetlands and roadsides, particularly in late winter and early spring, due to its dense, tall, and dry stands.

Previous Occurrences:

Because invasive species often spread over a long period of time and have dispersed effects, identification of hazard events concerning invasive species is difficult.

- The zebra mussel was discovered in Lake Champlain in the summer of 1993.
- The emerald ash borer was first discovered in Vermont in February 2018, and was detected in nearby Bristol (2019) and Middlebury (in 2021).
- Wild Parsnip was likely brought by early European settlers, but has escaped cultivation and populations have increased dramatically across the state in the last decade. In recent years it has been documented to cause 2nd degree burns to several individuals in parts of Vermont.

Future Probability:

Changes in climate are expected to increase the probability of invasive species introduction and spread, but projected land use and population changes are not expected to affect their impact on community assets or vulnerable populations. Existing and new invasive species are expected to continue moving into Shoreham through human transport and by natural reproductive spread.

Phototoxic terrestrial plants like Wild Parsnip can form dense stands which outcompete native species and become self-sustaining populations that continue to expand if not eradicated.

Some mobile species like ticks and Woolly Adelgid are moving north from southern Vermont and are expected to continue moving as milder winter temperatures allow them to overwinter. The *Aedes albopictus* (Asian tiger) mosquito, which can carry and transmit Zika, dengue, and other arboviruses including West Nile Virus, has an estimated geographic range that includes southern Vermont and is anticipated to move into Addison County.

In addition to concerns over Vermont's ash tree population, northern hardwood species like maple, yellow birch and American beech are predicted to largely vanish in the State, replaced by tree species such as oak and pine that thrive in warmer, drier conditions. The changing climate is expected to lead to less available water, resulting in additional stress to existing trees, which will increase their vulnerability to pest invasion and disease.

Vulnerability Summary:

Warming temperatures and milder winters makes Vermont more vulnerable to insect borne diseases and increases the chance these diseases can overwinter. While not strictly invasive, this shift in species distribution and range could threaten human health in the state. As the global climate continues to shift rapidly rate, species better adapted for warmer climates will continue to proliferate, causing changes in ecosystem composition that could destabilize basic ecosystem functions. Monetary and health costs associated with the disturbances invasives cause will continue to increase. However, future assets are not expected to experience increases in vulnerability to invasive species due to land use changes or changes in population demographics.

Invasives species are considered a **HIGHEST PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 8.00 determined

4.3.6 High Winds (Vulnerability Score 6.75)

High wind events can be the result of any of the following:

- **Wind Storm:** events without precipitation with gusts sustained at more than 31 mph for at least an hour or any gusts greater than 46 mph.
- **Hurricanes/Tropical Storms**: often result in high winds greater than 39 mph, along with inundation flooding, and fluvial erosion impacts.
- **Thunderstorm**: storms with precipitation, lightning, and/or hail, that can be compounded by downburst high winds potentially in excess of 80 mph.

(See Beaufort Wind and Saffir-Simpson wind scales in Appendix 4).

Location:

High winds can affect the entire planning area. In Vermont, high winds are most often seen accompanying severe thunderstorms. In Addison County, these storms usually originate from the west, southwest, or south.

Because Shoreham is distant from the base of the Green Mountains, it is less vulnerable to downslope windstorms and related hazards. Large-scale hurricanes affecting the entire region are infrequent because hurricanes typically lose wind speed as they move inland and downgraded to tropical storms by the time they reach inland Vermont.

Extent:

Wind-producing storms can range significantly in size and type. Wind storms and hurricanes can affect the entire state in a single event. Squall line thunderstorms move in a line or front that can exceed 100 miles in length, with the strongest rains and winds at the front of the storm. Thunderstorms can produce downburst winds that affect the land immediately beneath a storm. These downburst winds are called microbursts, which move outward from the base of a thunderstorm.

Previous Occurrences:

In Vermont, high winds most often seen accompany severe thunderstorms. In fact, straight-line winds are often responsible for most of the wind damage associated with a thunderstorm. These winds are frequently confused with tornadoes because they exhibit similar wind speeds and cause similar damage but the winds do not rotate as they do in a tornado.

While thunderstorms and associated hazards can occur anywhere and at any time of the year in Vermont; spring and summer are the most common times for severe thunderstorms. Tornadoes typically occur in Vermont between March and August.

Since 1970 NOAA has documented wind-damage from over 150 thunderstorms across Addison County, primarily during the spring and summer:

	Jan.	Feb.	Mar.	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Thunderstorm & Wind	0	1	2	0	21	32	72	35	9	3	3	1

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

Shoreham has had 9 NOAA-documented thunderstorm-wind events causing a reported $55,000 of property damage

Large-scale windstorms have affected wide portions of the state three times in the last decade: October 30, 2017, November 1, 2019, December 23, 2022. In each of these storms, strong winds affected all of Vermont's 14 counties, resulting in downed tree limbs, power outages, and uprooted trees which affected transportation routes.

Future Probability:

Wind events are considered **Highly Likely** in Vermont. The risk due to wind events is moderate for the built environment and minor for natural environment, people, and economy. Tornadoes are not common in Vermont. However, it is likely that as climate change accelerates, the area will see exacerbation of wind events such as hurricanes, tropical storms, and thunderstorms. Projected land use and population changes are not expected to significantly affect their impact on community assets or vulnerable populations, but may make such events more visible.

Vulnerability Summary:

People who live in rural, isolated communities like Shoreham are particularly vulnerable to windstorms. High winds can take down trees and power lines, resulting in blocked transportation routes, cut off electricity and telecommunication networks, and property destruction. Lack of electricity is life-threatening for those relying on electric life supports systems and electrical heating and cooling systems. In addition, isolated populations may have limited access to information and communication resources that could prevent injury or death. Future assets are not expected to experience increases in vulnerability due to land use changes or change in population demographics. Due to the risk to life and property represented by this hazard the Town expends considerable resources attempting to make its roads as safe as possible within a restricted budget. Future assets are not expected to experience increases in vulnerability to wind storms due changes in population demographics but they may increase with land use changes or increased residential development.

High wind events are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.75 determined.

4.3.7 Severe Cold (Vulnerability Score 6.75)

Location:
Severe cold events occur across the entire state, and are generally more severe at higher elevations. Temperatures in the lower, populated areas of Shoreham are somewhat moderated, but can still experience significant low temperatures.

Extent:
Vermont often experiences cold conditions during winters, however very cold temperatures remain a threat despite their regularity. The NOAA Wind Chill Chart identifies those temperatures and associated wind speeds that may cause frostbite if skin is exposed to the air over a certain period of time. In anticipation of extreme cold temperatures, the National Weather Service may issue the following watches, warnings or advisories, which are aimed at informing the general public as well as the agricultural industry:

- **Wind Chill Warning:** Dangerously cold wind chill values are expected or occurring
- **Wind Chill Watch:** Dangerously cold wind chill values are possible
- **Wind Chill Advisory:** Seasonably cold wind chill values but not extremely cold values are expected or occurring
- **Hard Freeze Warning:** Temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants
- **Freeze Warning:** Temperatures are forecasted to go below 32°F for a long period of time, killing some types of commercial crops and residential plants
- **Freeze Watch:** Potential for significant, widespread freezing temperatures within the next 24-36 hours
- **Frost Advisory:** Areas of frost are expected or occurring, posing a threat to sensitive vegetation

Previous Occurrences:
Since 1970, NOAA has documented severe cold and wind chill events across Addison County in a number of events, exclusively in the period from December to February:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nove	Dec
Cold/ Wind Chill	19	6	0	0	0	0	0	0	0	0	0	3

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

In January and March of 2007, several arctic cold fronts moved across Vermont on the 24th and delivered very cold temperatures as low as 15 degrees below zero along with blustery winds.

On January 14, 2009 an arctic cold front moved across Vermont during the early morning hours which delivered some of the coldest temperatures across the region in several years. As the arctic front passed across northern Vermont, temperatures dropped over 20 degrees within several hours. Temperatures averaged 20 to 25 degrees below normal values, which were already at climatological winter minimums. In parts of Addison County, minimum temperatures reached 20 degrees below zero. These extremely cold temperatures led to numerous cold weather-related problems including numerous dead vehicle batteries and broken home/business water pipes.

On January 7, 2015, early evening temperatures were zero to 10 above zero with winds of 15 to 30 mph that created wind chills colder than 20 to 30 below zero through the overnight into the morning hours of January 8th. Actual morning low temperatures on January 8th were 10 below to 20 below zero in Addison County, with temperatures dipping to 12 below zero in some locations.

On December 22-23, 2022, Addison County received high winds, downing power lines and closing roads, followed by cascading temperatures falling into the single digits, with wind chills of zero to the minus 0's. The greatest effect to Shoreham was the extended power outage.

Future Probability:

Warmer temperatures associated with climate change may result in milder winters but the possibility of jet stream alterations producing "bomb cyclones" that might increase sudden deep freezes or ice storms in early spring and late fall. As a result, some winter storms and severe cold events are predicted to increase in severity. Changes in land use and population are not expected to increase the impact of severe cold events on community assets or the population.

Vulnerability Summary:

Severe cold can drain vehicle batteries and freeze water pipes, leading to transportation challenges that prevent people from reaching work, school, childcare, grocery stores, and hospitals. Frozen or burst pipes can cut off water supply and cause extensive damage, leaving homeowners and business owners with costly repairs, cleanup, and potential loss of income or operations—compounding the hardship caused by the cold.

Future assets are not expected to experience increases in vulnerability to severe cold events due to land use changes or change in population demographics.

Severe cold events are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.75 determined.

4.3.8 Severe Snow Storm (Vulnerability Score 6.75)

Location:

Severe winter snow storms are common throughout Vermont and can occur geographically in any part of Shoreham. Generally, ice storms strike within a particular elevation band depending on temperatures with higher elevations experiencing snow and lower elevations experiencing rain. Located at a consistent elevation along Lake Champlain, Shoreham is at moderate risk for more widespread snow accumulation, with additional risk of drifting due to relatively flat topography.

Extent:

Because winter storms are extremely temperature and elevation dependent, they are notoriously difficult to predict. When conditions conducive to ice build-up are predicted, the National Weather Service issues a Winter Storm Warning with emphasis on ice accumulation.

The Winter Storm Severity Index (WSSI) (Appendix 5) is a categorization of overall severity based on six components:

- **Snow Amount:** to depict severity due to total amount of snow or rate of snowfall accumulation. (Adjustments are made based on climatology and urban areas, e.g. 4" of snow in Atlanta is more severe than 4" in Minneapolis.)
- **Snow Load:** to depict severity due to total weight of snow on trees and power lines.
- **Blowing Snow:** to depict severity mainly to transportation due to blowing and drifting snow.
- **Ice Accumulation:** to depict severity of transportation and downed trees/powerlines due to the accumulated ice in combination with wind.
- **Ground Blizzard:** to depict severity to mainly transportation of ground blizzards that develop due to a pre-existing snowpack and strong winds.
- **Flash Freeze:** to depict severity primarily to transportation of situations where temperatures rapidly fall below freezing during precipitation.

Previous Occurrences:

Since 1970, NOAA has documented winter storms across Addison County in a number of events, spanning the period from late October to April:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nove	Dec
Blizzard	0	0	1	0	0	0	0	0	0	0	0	0
Heavy Snow	0	7	1	0	0	0	0	0	0	0	0	1
Winter Storm	28	38	42	10	0	0	0	0	0	1	14	42
Winter Weather	54	32	27	12	0	0	0	0	0	7	11	44

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

The major impacts within the Town of Shoreham are generally limited to residents impacted by loss of power and the occasional downed tree or branches in the road. Loss of power to the town hall and garage are of concern due to the frequency of losses at these locations. In March 2001 a string of storms hit Shoreham and the rest of Vermont, beginning with 15-30" of snow on March 5-6, followed by 10-30" on March 22, and 10-20" on March 30.

Future Probability:

Warmer temperatures such as might be anticipated with climate change would result in less snow and a higher likelihood of ice in winter. Other predictions indicate that climate change will bring more atmospheric moisture and snowfall, or jet stream alternations producing "Bomb Cyclones" that might increase sudden deep freezes or ice storms in early spring and late fall. In all cases, winter storms are predicted to increase in severity. Changes in land use and development are not expected to increase the impacts of ice storms or power outages on community assets or the population.

Vulnerability Summary:

Severe snowstorms in rural Vermont pose significant threats to vulnerable populations and both current and future infrastructure. These storms can lead to power outages, road closures, and restricted access to essential services, disproportionately affecting older adults, individuals with health conditions, and those with limited mobility or financial resources. The accumulation of heavy snow can damage roads, bridges, and utility lines, while also impeding emergency response efforts. As climate change contributes to more frequent and intense winter storms, the strain on aging infrastructure and the challenges faced by vulnerable communities are expected to increase, underscoring the need for proactive adaptation and resilience planning.

The Town of Shoreham is a rural community with one major highway and dispersed population. Utility company priorities following storms are to repair the simplest fixes which impact the highest total populations as the highest priority. As a result, there is a moderate risk of extended power failures due to snow storm throughout the Town of Shoreham. Changes in land use and development are not expected to increase the impacts of snow storms or power outages on community assets or the population.

Severe snow storms are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.75 determined.

4.3.9 Drought (Vulnerability Score 6.00)

Shoreham Orchard irrigation pond, September 2025

Location:

Drought is an inherent, cyclical component of natural climatic variability and can occur at any place at any time. Drought events are often spread over a larger geographic area than other natural hazards, with gradation of impacts that are not as obvious as other hazards. Significant droughts would affect the entirety of the municipality of Shoreham, as well as adjoining municipalities and likely extending to other counties and states during the same event.

Extent:

The severity of a drought depends on the duration, intensity, and geographic extent of the water shortage, as well as the demands on the area's water supply. Droughts are rated in classifications from D0–D4, depending on the severity of the drought, the amount of time it will take for vegetation to return to normal levels, and the possible effects of the drought on vegetation and water supply. High winds, low humidity, and extreme temperatures can all amplify the severity of drought.

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures Coming out of drought: some lingering water deficits pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely Water shortages common Water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses Widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies

Source: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx

The impacts of drought are typically felt by agricultural enterprises and rural residents in areas like Shoreham first. Drought can cause extensive damage to gardens, agricultural crops and livestock. Drought can also lead to dry or low water levels in wells needed for drinking water. and can also concentrate water contamination levels and lead to resulting in potential health concerns.

Soil moisture, streams, and groundwater are all depleted due to drought. Drought depletes water availability for both cultivated and wild plants and animals. Lack of rain combined with high temperatures can lead to significant crop loss. As a result, the economic effects of a drought can be just as devastating as any other natural hazards.

Previous Occurrences:

Droughts, while low frequency hazards, are of serious concern to the population of Vermont. It is often difficult to recognize the onset of a drought during its preliminary stages.

Following a severe drought that had affected the area in the early 1960's, the Tri-Town Water District was established in 1965 to serve Addison, Bridport, and Shoreham, Vermont. The idea was championed by Rev. Benjamin Wysolmerski, parish priest for Bridport and Shoreham, who was involved in town water efforts.

Source: https://www.drought.gov/states/vermont#historical-conditions

Since 2000, drought conditions measured by intensity indices have periodically surged in Vermont. Beginning in 2001, New England experienced historic drought conditions not seen since the 1960s. In 2001-2002, large parts of Vermont were affected by a Severe Drought (D2), but Shoreham and the Champlain Valley were judged to have only reached Abnormally Dry (D0) conditions.

A series of drought conditions have affected portions of Vermont nearly annually over the past decade. Parts of central Vermont were in Severe Drought (D2) from October 2016 through April 2017, peaking in October and November 2016. At least 80% of the State was in at least Moderate Drought (D1), including all of Shoreham and Addison County reaching Severe Drought (D2) (Figure). Moderate Drought conditions returned in October of 2017 and again in June 2018.

Since 2018 there have been four Severe Droughts, more than the previous two decades combined. From September to November of 2018 the State experienced another Severe Drought. Then from June 2020 to October 2021 much of the State was under Moderate Drought to Abnormally Dry conditions. From September to October of 2020 29.4% of the State was under Severe Drought conditions. A severe drought occurred from June through September, 2025. According to a state survey, Addison County saw the most acres affected by far. Thirty farmers across the county reported a little more than $1.4 million in damages across about 25,000 acres.

Figure. Reported acreage affected by 2025 summer drought

(Source: VT Agency of Agriculture, Food and Markets 2025 Agricultural Drought Impact Survey)

Figure. Addison County 2025 Agriculture Drought Impact Survey Results

(Source: VT Agency of Agriculture, Food and Markets 2025)

Future Probability:

Relative to other regions of the country, severe droughts are not frequent occurrences in Vermont. However, changes in climate are expected to significantly increase the probability
Drought events. Both wet and dry extremes are expected to increase over time across the state: Vermont's precipitation trend is an on upward trajectory, having seen increases in average annual precipitation of 7.5 inches since 1900. At the same time Vermont is seeing an increase in average annual maximum and minimum temperature, which is contributing to an increased likelihood of drought. Higher temperatures lead to increased rates of evaporation, combined with dry periods between intense precipitation events will lead to increased dry conditions.

Land use changes are not expected to significantly affect the impact of droughts on community assets, but changing demographics, especially isolated or aging populations, may increase vulnerability. For instance, isolated residents may be unable to obtain drinking water.

Vulnerability Summary:

Changes in climate may increase the probability of droughts. Drought frequency and severity is unlikely to be affected by land use or demographic changes, or cause additional impact on community assets.

Droughts are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.00 determined.

4.3.10 Flash Flooding & Fluvial Erosion (Vulnerability Score 6.00)

Location:
Fluvial erosion is the wearing-away of streambed and streambank associated with physical adjustment of stream channel dimensions (both width and depth). It occurs naturally in stable, meandering rivers and small streams.

Fluvial erosion typically occurs as a result of one of the following:

Rainfall: Significant precipitation from rainstorm or hurricane/tropical storm, causing flash flooding when a large amount of precipitation occurs over a short period of time.

Snowmelt: Melted runoff due to rapidly warming temperatures, often exacerbated by heavy rainfall. The quantity of water in the snowpack is based on snow depth and density.

Ice Jams: A riverine back-up when flow is blocked by ice accumulation, often due to warming temperatures and heavy rain which causes snow to melt rapidly.

Location:

The generally gentle topography of Shoreham does not lend itself to widespread high velocity flood events common to fluvial erosion events. Previous plans have identified several vulnerable areas where roadways cross streams and the statewide Transportation Resilience Planning Tool (TRPT) identifies portions of VT Route 22A as highly vulnerable and critical. Portions of Lake Street and Townline Road and Rattlin Bridge Road, serving several residences, are at higher risk.

Extent:

Summer downpours and remnants of tropical storms can have the effect of concentrating flood waters into rivers and small and narrow stream areas, particularly in steeper geographic regions. In Shoreham there are approximately 1479 acres of state-identified river corridor areas along rivers and small streams, with 764 of those acres outside the 100-year floodplain. (See yellow corridor areas on 2.2.4. Flood Resiliency Map**, page 20).** River Corridors encompass the area of land surrounding a river that provides for the meandering, floodplain, and the riparian functions necessary to restore and maintain the naturally stable or least erosive form of a river thereby minimizing erosion hazards over time. Lands within and immediately abutting a river corridor are at higher risk to fluvial erosion. They are mapped by the Vermont Agency of Natural Resources using calculations that rely on in-field and map-based measurements. Recent erosion of these in Shoreham is undocumented and thought to be minimal, but these areas are the most likely extent of flash flooding and fluvial erosion occurrence.

According to NCDC statistics, the Addison Region has experienced 31 flash flood events over the past 25 years. The highest record of damage in Addison County was $1,000,000 during a period in July of 1998. During the period an estimated $32,310,000 in property damages and $1,500,000 in crop damages were incurred. None of this damage was experienced in Shoreham due to the limited infrastructure located in susceptible terrain. Shoreham may also be affected indirectly by flash flooding in nearby areas, as the closing of other North-South state routes (VT Route 7 or VT Route 30) might result in an inordinate amount of traffic being directed onto VT Route 22A and other parts of Shoreham's road system.

Figure. Shoreham Road Infrastructure Asset Risk from the Vermont Transportation Resilience Planning Tool (TRPT) (https://roadfloodresilience.vermont.gov/#/map)

Figure. Shoreham Culvert Infrastructure Asset Risk from the Vermont Transportation Resilience Planning Tool (TRPT) (https://roadfloodresilience.vermont.gov/#/map)

Previous Occurrences:

According to NOAA statistics, the Addison Region has experienced more than 45 flash flood events over the past 25 years. These generally occur in the summer months due to intense rainstorms, but they can occur in other seasons as well.

Table. NOAA recorded flash flood events by month of occurrence

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nove	Dec
Flash Flood	2	1	1	2	7	10	13	7	0	2	1	1

The Halloween storm of October 31-November 1, 2019 brought more than 3 inches of rain and gusting southwest winds that caused flooding and power outages across the region.
In Shoreham, flooding damaged culverts and covered roadways.

Future Probability:

Changes in climate are expected to increase the probability of large rainfall events and rapid snow melt that may have increasing impacts on community assets. In Vermont, average annual precipitation has increased by almost 7 inches over the past 50 years. The northeastern United States is projected to experience above average precipitation in the winter and spring, with even wetter conditions expected under a high greenhouse gas emissions scenario, and is also projected to experience more frequent, heavier rainfall events. These anticipated increases in both frequency and magnitude of precipitation in Vermont are expected to lead to alterations of hydrology and increased flash flooding events and fluvial erosion. Additional development in Shoreham could potentially affect the impact of flash flood events on vulnerable populations.

Vulnerability Summary:

Flash flooding is an increasing concern for residents of the Town of Shoreham. Although few areas are susceptible to flooding, the expense of infrastructure repairs make the community relatively vulnerable to large scale damages caused by flash flooding. Future assets are not expected to experience increases in vulnerability to flash flooding due to change in population demographics but may be increase with land use changes.

Flash flooding and fluvial erosion are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.00 determined.

4.3.11 Air Quality (Vulnerability Score 6.00)

Location:
Vermont municipalities including Shoreham, especially the inland valley and mountain-fringe areas can experience air quality concerns from regional smoke, ozone transported from urban/industrial areas, and localized wood-smoke or agricultural emissions that settle under certain weather conditions.

Extent:

The Air Quality Index (AQI) is EPA's index for reporting air quality, ranging from 0 to 500. The higher the AQI value, the greater the level of air pollution and the greater the health concern. AQI categories are:

- **Less than 50: Good**
- **51 to 100: Moderate-** Concerning for some people who may be unusually sensitive to air pollution
- **101 to 150: Unhealthy for some groups**- Concerning for some groups- concerning for people highly affected by air pollution: People with heart or lung disease, Older adults, Children
- **151 to 200: Unhealthy**- concerning for Everyone
- **201 to 300: Very unhealthy**- concerning for Everyone
- **301 to 500: Hazardous**- concerning for Everyone

There is an AQI for major pollutants such as ozone, particle pollution (PM2.5 and PM10), and gaseous particles. Air from pollution such as wildfire smoke – a mixture of particle and gas pollutants from burning trees, buildings and other materials – is unhealthy to breathe in, especially for people who are highly affected by air pollution.

Previous Occurrences:

The greatest impacts to communities from wildfires are smoke from wildfires in Canada and the western United States. In 2023, Shoreham and much of Vermont experienced substantial impacts from Canadian wildfire smoke from June 5 to 8, and again in August 2025. The entire state experienced poor air quality, with records for highest ever 24-hour average concentration of fine particulate matter (PM2.5, µg/m3), broken several times over multiple days and far exceeding the previous records. Air quality was worst in the south and west of Vermont, with the Air Quality Index exceeding 400 in some locations, considered "hazardous" for all populations, resulting in cancellations of outdoor activities and widespread distribution on N95 masks to the public.

April McCullum / Vermont Public

A map of air quality, provided by the Environmental Protection Agency, shows parts of Vermont and Montreal with "very unhealthy" air quality early in the morning of June 26, 2023.

In Shoreham and other communities in proximity to New York, there have been concerns about particulate matter and airborne toxins from across the lake. In 2006, the International Paper Company plant in Ticonderoga, NY conducted a controversial two-week test burn of shredded tires as fuel (tire-derived fuel). The permit, issued by the New York State Department of Environmental Conservation, caused significant concern in neighboring Vermont over potential emissions of heavy metals and toxic chemicals like benzene and naphthalene

Future Probability:

Climate change is expected to increase the risk of wildfires and other sources of pollution, which will impact human health more.

Vulnerability Summary:

Air quality events are considered a **HIGH PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 6.00 determined.

4.3.12 Severe Ice Storm (Vulnerability Score 5.25)

Location:

Severe ice storms are common throughout Vermont and can occur geographically in any part of Shoreham, and often across the entire town and region in a short period of time. Generally, ice storms strike within a particular elevation band depending on temperatures with higher elevations experiencing snow and lower elevations experiencing a mix of ice and rain. Located at a consistent elevation along Lake Champlain, Shoreham can be at high risk for more widespread ice accumulation.

Extent:

Because winter storms are extremely temperature and elevation dependent, they are notoriously difficult to predict. When conditions conducive to ice build-up are predicted, the National Weather Service issues a Winter Storm Warning with emphasis on ice accumulation.

The Winter Storm Severity Index (WSSI) (Appendix 5) is a categorization of overall severity based on six components:

- Snow Amount: to depict severity due to total amount of snow or rate of snowfall accumulation. (Adjustments are made based on climatology and urban areas)
- Snow Load: to depict severity due to total weight of snow on trees and power lines.
- Blowing Snow: to depict severity mainly to transportation due to blowing and drifting snow.
- Ice Accumulation: to depict severity of transportation and downed trees/powerlines due to the accumulated ice in combination with wind.
- Ground Blizzard: to depict severity to mainly transportation of ground blizzards that develop due to a pre-existing snowpack and strong winds.
- Flash Freeze: to depict severity primarily to transportation of situations where temperatures rapidly fall below freezing during precipitation.

Previous Occurrences:

The National Climatic Data Center reports that the Addison Region has experienced two major Ice Storm events over the past 25 years. During that period an estimated $850,000 in total property damages were recorded in the region. The highest recorded damages were incurred during the January 1998 Ice Storm which impacted most of the northeastern US and resulted in ice accumulations of up to ¾ inch, a loss of power for up to 2.5 weeks, and $750,000 in damages to Addison County. The Shoreham hazard mitigation committee identified the 1998 ice storm as the worst that had occurred in the region. Fortunately, the residents of Shoreham were largely spared the effects of this storm. On December 22-23, 2022, Addison County received high winds, downing power lines and closing roads, followed by cascading temperatures falling into the single digits, with wind chills of zero to the minus 0's, but again Shoreham was largely spared the effects.

Since 1970, NOAA has documented winter storms across Addison County in a number of events, spanning the period from November to April:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Ice Storm	1	0	0	0	0	0	0	0	0	0	0	1
Winter Storm	28	38	42	10	0	0	0	0	0	1	14	42
Winter Weather	54	32	27	12	0	0	0	0	0	7	11	44

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

The impacts within the Town of Shoreham are generally limited to residents impacted by loss of power and the occasional downed tree or branches in the road. Loss of power to the town hall and garage are of concern due to the frequency of losses at these locations. In March 2001 a string of storms hit Shoreham and the rest of Vermont, beginning with 15-30" of snow on March 5-6, followed by 10-30" on March 22, and 10-20" on March 30.

Future Probability:

Warmer temperatures such as might be anticipated with climate change would result in less snow and a higher likelihood of ice in winter. Other predictions indicate that climate change will bring more atmospheric moisture and snowfall, or jet stream alternations producing "Bomb Cyclones" that might increase sudden deep freezes or ice storms in early spring and late fall. In all cases, winter storms are predicted to increase in severity. Changes in land use and development are not expected to increase the impacts of ice storms or power outages on community assets or the population.

Vulnerability Summary:

The Town of Shoreham is a rural community with one major highway and dispersed population. Utility company priorities following storms are to repair the simplest fixes which impact the highest total populations as the highest priority. As a result, there is a high risk of extended power failures due to ice storm throughout the Town of Shoreham.

Severe Ice Storms are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 5.25 determined.

4.3.13 Insect-borne Illness (Mosquitoes and Ticks) (Vulnerability Score 5.25)

An infectious disease is caused by micro-organisms, such as bacteria, viruses or parasites. A vector-borne disease is an infectious disease that is transmitted to humans by blood-feeding arthropods, including ticks, mosquitoes, and fleas, or in some cases by mammals (e.g. rabies). For the purposes of this plan, Shoreham has separated tick-borne and insect-borne diseases, transmitted primarily through mosquitoes, into a separately evaluated hazard.

Shoreham is not a member of Insect Control District (ICD). There are only two insect control districts in the state of Vermont (the Lemon Fair ICD in Cornwall-Bridport-Weybridge, and the other is located in the towns on the east side of Otter Creek). The LFICD has identified about 800-900 treatable acres along the Lemon Fair River, and up to 400 acres in the Cornwall Swamp.

The Vermont Department of Health has separated vector-borne and other infectious diseases into five threat categories. Diseases spread by ticks and mosquitoes include:

Threat Classification	Disease	Vector
Diseases already present in Vermont that may be exacerbated by climate change	West Nile Virus	Mosquitoes
	Eastern Equine Encephalitis	Mosquitoes
	Lyme Disease	Ticks
	Anaplasmosis	Ticks
	Babesiosis	Ticks
	Hard Tick Relapsing Fever	Ticks
	Jamestown Canyon Virus	Mosquitoes
	Tularemia	Ticks, Flies
	Powassan Virus	Ticks
Diseases that may spread to Vermont even without contribution of climate change, whose spread to and transmission of Vermont could be exacerbated by climate change	St. Louis Encephalitis	Mosquitoes
	Western Equine Encephalitis	Mosquitoes
	La Crosse Encephalitis*	Mosquitoes
	Ehrlichiosis	Ticks
	Alpha-gal Syndrome	Ticks
	Rocky Mountain Spotted Fever	Ticks
Diseases with vectors that may spread to Vermont by the end of the century under a higher emission scenario	Dengue	Mosquitoes
	Zika Virus	Mosquitoes
	Chikungunya Virus	Mosquitoes
Diseases that have or may in the future have competent vectors in Vermont, but are unlikely to become established in Vermont despite a vector presence	Yellow Fever	Mosquitoes
	Malaria	Mosquitoes
	Chagas Disease (insects)	Insects
	Rift Valley Fever	Mosquitoes
Diseases that may be present in Vermont or may spread to Vermont in the future but whose link with climate changes expected in Vermont is tenuous.	Bartonellosis (fleas/lice)	Fleas/Lice
	Plague	Fleas (rodents and cats)

(from 2016 Vermont Climate Health Report see full chart in infectious disease section).

Location:

In Shoreham, mosquito-borne illness poses a seasonal health threat, particularly during the warmer months when mosquito populations flourish. The Lemon Fair River, with its slow-moving waters and adjacent floodplains, creates ideal breeding grounds for mosquitoes, is the primary habitat for a floodplain mosquito known as *Aedes vexans* (a nuisance mosquito).

The Shoreham Swamp provides a large, undisturbed wetland habitat where *Culiseta melanura* black mosquito larvae thrive, and are known to carry Eastern Equine Encephalitis (EEE). Additionally, numerous wet areas on private properties—such as poorly drained lawns, clogged gutters, and standing water in containers—serve as smaller, but widespread breeding sites that help sustain local populations of Common or Northern House Mosquitoes (*Culex pipiens)* known to carry diseases such as West Nile virus.

The risk to surrounding populations varies based on proximity to these breeding areas and individual property conditions. Residents living near the Shoreham Swamp may face elevated exposure, particularly if preventative measures are not taken to control standing water or limit outdoor activity during peak mosquito hours. However, even those farther from large wetlands may be affected due to mosquitoes traveling short distances and breeding in overlooked backyard environments. Public health agencies urge continued surveillance and mosquito control efforts, along with public education campaigns, to reduce the risk of transmission and protect community health throughout the region.

Extent:

West Nile virus (WNV) is a Flavivirus from the family Flaviviridae that can infect a wide range of vertebrates. Birds are the natural reservoir for WNV. WNV is maintained in nature in a mosquito–bird transmission cycle primarily involving Culex mosquitoes. Many species of birds survive their infections and develop permanent immunity; the virus can even become amplified in some bird species, contributing to the transmission cycle between birds and mosquitos. However, several species become ill and die, particularly corvids such as crows, blue jays, and ravens.

Approximately 80% of humans infected with WNV do not develop symptoms, and 20% experience a febrile illness. Less than 1% develop severe neurologic illness, such as encephalitis or meningitis, which can be fatal in a small percentage of cases. People over 50 years of age and individuals with weakened immune systems are at greatest risk for severe illness.

The virus was first detected in Vermont in 2000 and has spread to all 14 counties. WNV is considered enzootic and widespread in Vermont, and the risk is considered uniform throughout the state. Active mosquito-based WNV surveillance is conducted June through October every year throughout Vermont, and passive veterinary and human surveillance is conducted year-round.

Eastern Equine Encephalitis virus (EEV) is maintained in nature through avian hosts and *Culiseta melanura* mosquitoes located primarily in freshwater, hardwood swamps. Mosquito species from the genera *Aedes, Ochlerotatus, Coquillettidia*, and *Culex* that bite both birds and mammals are considered "bridge" vectors and allow transmission of EEEV to mammals

The virus is well established in North America, but human cases are relatively uncommon, with an annual average of 11 cases reported nationally during 2010–2019. Most EEEV activity has occurred in the Atlantic, Gulf Coast, and Great Lakes states. The first evidence of EEEV in Vermont was identified through a 2010 deer and moose serosurvey.

In humans, an infection with EEEV can vary from asymptomatic to severe illness. People who become ill with an EEEV infection either have systemic or encephalitic disease. Symptoms of a systemic illness include the abrupt onset of fever, chills, fatigue, arthralgia, and myalgia, which lasts 1–2 weeks. Those with encephalitic disease may have fever, headache, irritability, vomiting, diarrhea, convulsions, and other symptoms; approximately one third of people with encephalitis from EEEV infection die and about half of those who survive have some degree of permanent neurologic damage.

Jamestown Canyon Virus (JCV) is a bunyavirus belonging to the California serogroup and circulates in nature in a cycle including deer and various mosquito vectors. The transmission cycle of JCV is still not fully understood, but it is thought that early season mosquitoes, such as Ochlerotatus species, play a significant role in the early amplification of the virus within deer populations. These species overwinter as eggs and may be infected when they are laid in the fall by an infected female mosquito. When the eggs hatch after the snow melts in the spring, they are able to transmit the virus when they take their first bloodmeal. Late season amplification as well as transmission to humans is also thought to be connected to certain Anopheles mosquitoes, which readily bite mammals, including humans.

Many people infected with JCV do not develop any illness, but the proportion of asymptomatic infections among all infections is unknown. In people who develop illness, JCV will cause a mild, febrile illness. Some patients also report respiratory symptoms, such as cough, rhinitis, or pharyngitis. The incubation period for JCV disease is unknown. Neuroinvasive disease (meningitis or encephalitis) has been reported. No human infections with JCV have been reported in Vermont to date. In recent years the number of annual JCV cases reported to the CDC by other states has been increasing, although this is thought to be due to increased awareness and testing efforts.

Lyme Disease

In 2019, Vermont ranked highest in the United States for Lyme disease incidence, and is often at or near the top of incident rankings. The Vermont Department of Health has tracked Lyme disease cases in the state since for several decades, though not at the town-level. Shifting habitats and climate changes continue to create favorable conditions for pathogen-carrying ticks to proliferate.

Previous Occurrences:

The state has an Arbovirus Surveillance and Response Plan[1], updated in 2024, that it implements with sampling and testing. Several insect-borne diseases are frequently present in and around Shoreham; West Nile Virus was confirmed in mosquito populations in Vergennes and New Haven in August and September of 2023. There had not been any cases of Jamestown Canyon Virus in Vermont until the first human case of the virus was confirmed in Windsor County in 2025.

Figure. 2025 Surveillance Map [2]

Future Probability:

Climate change is intensifying the risk of mosquito-borne illnesses in Shoreham, Vermont, as warmer temperatures and increased precipitation create more favorable conditions for mosquito proliferation. The expansion of mosquito habitats, coupled with longer breeding seasons, heightens the potential for diseases such as Eastern Equine Encephalitis (EEE) and West Nile virus to affect the region. This trend is evident in the broader Northeast, where EEE cases have emerged in states including Vermont, New Hampshire, and Massachusetts, prompting public health advisories and preventive measures. In Vermont, the combination of milder winters and wetter summers has been linked to a surge in mosquito populations, thereby increasing the likelihood of disease transmission.

The increase in Lyme disease is the most significant trend in infectious disease cases from ticks in Vermont. The Vermont Department of Health reports a dramatic increase in reported cases of Lyme disease around the state and milder, shorter winters increases the potential for infection through tick bites. Additionally, early successional habitat on road edges and retired farmland could provide a more suitable habitat for ticks and their hosts, which may lead to further spread of Lyme disease.

Vulnerability Summary:

People who are most vulnerable to insect-borne diseases include immunocompromised individuals, elderly and young populations, and those frequently outdoors. Due to weakened immune systems or compounding factors of other illnesses or stressors these populations are at heightened risk of infection and death. Outdoor laborers and recreationalists are especially vulnerable to mosquito-vector transmission and tick bites that may cause Lyme disease. Future assets are not expected to experience increases in vulnerability due to land use changes or change in population demographics.

Insect-borne Illnesses are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 5.25 determined.

4.3.14 Large-Scale Hazardous Materials Incident (Vulnerability Score 5.00)

Location:

There are only two sites in town that have sufficient types and/or quantities of hazardous materials to require Tier II reporting. One is owned and operated by the Town and set back from any nearby residences and roadways. The other is a fuel company located very close to the village and the intersection of VT Route 22A and VT Route 125. A major fire or accident release at either location would have significant impacts on residents, commerce, town operations and traffic.

Truck accidents could also result in a release of hazardous materials and accident locations of concern to the committee are identified in the section on Highway Accidents. Generally, with the constant movement of petroleum in the form of home heating oil, any location along a town highway or at a residence could be the site of a spill, either as a result of an accident or during delivery. As previously mentioned, VT Route 22A is a major route for fuel and gasoline transport along the western part of Vermont.

Highway accidents are possible along all highways in town but are particularly noticeable along VT Route 22 as it passes through the center of Shoreham. VT Route 74 is also a major transportation route for trucks and potentially hazardous materials.

Extent:

Truck Traffic on VT Route 22A poses the highest risk in town due to both the volume and types of cargo being carried. A worst-case scenario of a truck rollover involved with other vehicles could result in fires, environmental damage, and road closure for hours or even multiple days. This could potentially detour traffic to VT Route 30 or other residential areas along Lake Champlain.

A 1000-foot buffer was superimposed over state highways and all class 1 and 2 town roads that represent a possible impact area should a large hazardous material spill occur on these highways. Based on this analysis, there are 30 structures that could be impacted should an incident with a vehicle carrying Hazardous Materials occur. These are primarily residential and farm structures.

Previous Occurrences:

No major incidents involving large-scale hazardous materials spills have occurred in Shoreham though numerous incidents have occurred elsewhere in the region and state. Vehicle crashes involving heavy trucks have only occurred on VT Route 22A.

Figure. Crashes involving heavy trucks, 2010- 2025
(https://apps.vtrans.vermont.gov/crashpublicquerytool/)

Future Probability:

VT Route 22A will continue to be one of the primary north/south-route on the western side of the state and trucks carry a mix of hazardous materials through Shoreham along this highway. Increases in truck traffic seem inevitable as long as the population demands more products and online shopping is more convenient and available than local stores.
A lessening of gasoline and fuel oil use is a goal of the State of Vermont energy plan, which may limit vehicle usage, as well as overall transportation of fuel by truck and rail.

Vulnerability Summary:

While the Shoreham Fire Department has training in hazardous materials response, the entire State of Vermont is highly dependent on the limited resources of the State's HazMat team. Fortunately, highway safety is improving both in alignments of the highways themselves and in safer vehicle designs. Until major overhauls of sections of highway can be completed, Shoreham will need to continue to rely on signage and enforcement of speed limits to keep the numbers of accidents in check. Future assets are not expected to experience increases in vulnerability due to land use changes or change in population demographics.

Large-scale hazardous materials incidents are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 5.00 determined.

4.3.15 Infectious Disease Outbreak (Vulnerability Score 4.50)

An infectious disease is caused by micro-organisms, such as bacteria, viruses or parasites. A vector-borne disease is an infectious disease that is transmitted to humans by blood-feeding arthropods, including ticks, mosquitoes, and fleas, or in some cases by mammals (e.g. rabies). This section covers Zoonotic Diseases, spread by animals (including Rabies, Avian Influenza or Bird Flu, Hantavirus, Tularemia) and respiratory viruses (including Coronavirus 19 (COVID-19), influenza, Respiratory syncytial virus (RSV), etc.).

For the purposes of this plan, Shoreham has separated tick and insect-borne diseases, primarily through mosquitoes, into a separately evaluated hazard (Section 4.3.13).

An epidemic emerges when an infectious disease occurs suddenly in numbers above normal expectancy. Infectious disease outbreaks put a strain on the healthcare system, can cause continuity of operations challenges for local businesses, impact the economy, and interrupt daily life for everyone within a community. These outbreak incidents are a danger to emergency responders, healthcare providers, schools, and the public.

Extent:

Infectious diseases come in a wide variety of types and have a broad range of effects. In most cases, only a few individuals are affected. However, more virulent infectious disease outbreaks have the potential to affect the entire community over a long period of time.

Municipal staff, volunteers, and road crews in Vermont face heightened vulnerability to **respiratory illnesses** like COVID-19 and RSV, especially during peak seasons. Respiratory illnesses like COVID, flu, and RSV spread mainly through infectious droplets and aerosols released when an infected person breathes, talks, coughs, or sneezes, and by touching contaminated surfaces and then the face. As essential workers who often operate in close-knit teams and prioritize public-facing duties these personnel are likely to see increased sick leave, reduced staffing capacity, and potential disruptions to municipal services during intense respiratory illness waves.

Several infectious zoonotic diseases that may be present in the state or may spread to Vermont in the future may not be directly influenced by climate change, but will continue to be a serious concern. **Rabies** poses risks of fatal viral transmission to humans and unvaccinated animals via bites. **Hantavirus**, though relatively rare with only two confirmed Vermont cases since 1993, causes severe respiratory illness after exposure to virus-laden rodent droppings — notably those of deer and white-footed mice. **Leptospirosis**, spread through contaminated water and soil via mammalian urine (e.g., rodents, raccoons, livestock), can lead to serious kidney and liver issues and is emerging as a threat to both humans and pets in Vermont. **Plague** remains predominantly a western U.S. disease, but travel or wildlife movement could introduce it; typically bubonic and contracted from rural rodent reservoirs, it averages around seven U.S. cases annually. **Valley Fever**, caused by the soil-based Coccidioides fungus, isn't endemic to Vermont but climate shifts raise concerns for possible eastward spread of spores and risk of respiratory infection. **Anthrax** persists in soil and livestock, particularly cattle, sheep, and goats; humans may contract it through contact with infected animals or products, with spores capable of persisting in the environment for decades. **Q Fever**, transmitted via inhalation of contaminated materials from sheep, goats, or

cattle, can cause flu-like illness and chronic conditions like endocarditis, notably impacting agricultural workers.

Waterborne Illnesses

When large runoff delivers excess nutrients like phosphorus and nitrogen into lakes, the warmer, calmer waters become prime habitat for blooms, which can release harmful toxins that cause skin rashes, throat irritation, gastrointestinal distress, and serious illness in humans and pets. Flooding events elevate the risk of waterborne parasites such as **Cryptosporidium**: heavy rains wash animal feces into surface waters, and the parasite's hardy oocysts can survive traditional chlorination, leading to outbreaks of diarrhea and dehydration—especially affecting children, the elderly, and immunocompromised individuals.

Location:

Infectious disease cases have been dispersed throughout Vermont and likely in Shoreham. Low population density in town may reduce the spread of respiratory disease within town, but the small number of business and town offices may congregate residents and increase local exposure. Workers travelling to more distant locations like Burlington, Middlebury and Rutland may also increase the chances of exposure to and spread of respiratory illnesses.

Proximity to livestock from farms and wild animals in rural areas throughout the rural areas of town increases potential exposure to zoonotic disease. Waterborne illness are most likely along the edge of Lake Champlain where residents recreate and may be exposed to algal blooms or waterborne parasites from runoff events.

Previous Occurrences:

Respiratory diseases have had the greatest impact and most widespread previous occurrences. Pandemic influenza, considered to be a global outbreak, spread quickly around the world and was observed in 1918, 1957, 1968 and in 2009 with the novel H1N1 strain. The great influenza epidemic of 1918 killed millions worldwide and would likely cause hundreds to thousands of deaths in Vermont should a similar outbreak occur today. The 2009 H1N1 outbreak, though not considered a serious threat to the state, still affected some Vermonters.

The COVID-19 pandemic led to a complete disruption of daily life in Vermont. A state of emergency was issued by Governor Phil Scott on March 13, 2020 to help ensure Vermont had the resources necessary to respond to the COVID-19 public health emergency. In the following weeks, a series of executive orders were issued restricting activities likely to result in transmission or use up valuable medical resources. Some of these included restricting visitor access to long term care facilities, suspending in person PreK-12 education, closing bars and restaurants, suspension of elective and non-essential medical surgeries, interstate travel restrictions, and limits on non-essential gatherings. COVID-19 restrictions stayed in effect until June 14, 2021 when 80% of Vermont's eligible population (those 12 and older) had received at least one dose of COVID-19 vaccine, in accordance with the State's Vermont Forward Plan. To date, Vermont has documented more than 150,000 cases and 900 deaths due to COVID-19. A more serious strain of the flu is anticipated in the future and vaccines might not be available in time to combat rapid spread.

Vector-borne diseases, even beyond Mosquito and Tick-borne illnesses, continue to pose a significant and growing threat. Rabies remains a serious concern in Vermont, with 66 rabid animals identified in 2024 — primarily raccoons, skunks, foxes, bats, and woodchucks. Rabies cases have been noted recently in and near Shoreham. Between 2005 and 2023 Shoreham has had six rabies cases identified, primarily in raccoons, as well as a skunk, cat, and a cow. In Vermont, rabies is most commonly found in wild animals such as raccoons, skunks, foxes, bats and woodchucks. Cats, dogs and livestock can also get rabies if they have not been vaccinated.

Source: 2023 State Rabies Surveillance Report

The presence of highly pathogenic avian influenza (HPAI), also known as H5N1 bird flu, has been circulating in Vermont since 2022. A bobcat and two red-tailed hawks found dead in Cornwall tested positive for HPAI in early 2024. HPAI is uncommon in mammals, and the bobcat that tested positive was the first detection of HPAI virus in a mammal in all of Vermont HPAI was also confirmed in a backyard chicken flock in Franklin County in December 2024. This was the fourth instance of HPAI in a domestic flock in Vermont since spring of 2022 and emphasizes the ongoing need for vigilance as the disease continues to be an ongoing risk to domestic birds.

Future Probability:

Changes in climate are expected to increase the probability of Infectious Disease introduction and spread. According to the Centers for Disease Control (CDC), the number of reported cases of vector-borne infectious disease more than tripled between 2004 and 2016 and can be expected to continue rising. Warmer temperatures allow more diseases and their vectors to expand and establish populations farther north, where harsh winters temperatures previously inhibited expansion. Projected land use changes are not expected to affect the impact of infectious disease on community assets, but changing demographics may result in faster spread and impacts on vulnerable populations. With increasing trends for global travel and short-term visitors, diseases not previously observed in Vermont may be introduced by infected travelers and spread to the local population.

Vulnerability Summary:

People who are immunocompromised, elderly and young, and healthcare workers are most vulnerable to infectious disease. These populations are at heightened risk of infection and death due to weakened immune systems or compounding factors of other illnesses or stressors. Future assets are not expected to experience increases in vulnerability to infectious diseases due to land use changes but may increase with changes in population demographics.

Infectious disease outbreaks are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 4.50 determined.

4.3.16 Hail Storm (Vulnerability Score 4.50)

Location:

Hail can occur anywhere in Vermont, but tend to be highly localized and limited to a relatively small area.

Extent:

Hail is considered a relatively infrequent occurrence in Vermont. Storms can be significant to local farmers, who can lose entire fields of crops in a single hailstorm. Large hail is also capable of property damage, including both structures and vehicles. Hailstone size can range from the size of a pea to the size of a melon.

Previous Occurrences:

There have been several significant hailstorms documented in Shoreham since 1970. There have been documented occurrences in neighboring Bridport (7) and Orwell (2), all between 2008 and 2014 and all with magnitudes of quarter and half-dollar equivalent in hail size. No property or crop damage was recorded as a result. Hailstorms usually occur in Vermont during the summer months and generally accompany passing thunderstorms.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Shoreham	0	0	0	0	3	2	2	1	0	0	0	0
Neighboring Towns	0	0	0	0	1	5	2	1	0	0	0	0

Source: https://www.ncdc.noaa.gov/stormevents/

Future Probability:

Significant hailstorms are likely to occur relatively infrequently, and have not shown significant change in frequency over time. According to the 2018 National Climate Assessment, changes in the frequency or severity of hail events are still uncertain. Changes in climate may slightly increase the probability of Hail Storms, but projected land use and population changes are not expected to affect their impact on community assets or vulnerable populations.

Vulnerability Summary:

The impact from hail is considered to be negligible to infrastructure, life, the economy and the environment. However, hail can damage property, young and tender plants, and cause bodily harm to those individuals unfortunate enough to be caught outside. As a result, farmers and outdoor recreationists are more vulnerable to hailstorms than other groups of people.

Severe hail storms are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 4.50 determined.

4.3.17 Wildfire (Vulnerability Score 4.25)

Location:

Severe wildfires are uncommon throughout Vermont, but minor fires are regular occurrences and could conceivably occur in any part of Shoreham. Un-mowed field edges and grass or shrub vegetation are the most likely locations for fires to start.

Extent:

Wildfire conditions in the Champlain Valley are typically at their worst either in spring when dead grass and fallen leaves from the previous year are dry and new leaves and grass have not come out yet. The majority of fires in Vermont are caused by burning debris, though they can be a result of naturally occurring influences such as lightning, and exacerbated by drought and extreme heat. Open burning of natural and untreated wood, brush, weeds, or grass requires a 'Permit to Kindle Fire' from the Town Forest Fire Warden. When there is significant fire danger, open burns are banned entirely.

Wildfire risk may be increased by the presence of invasive *Phragmites* (*Phragmites australis*), or Common Reed, a highly aggressive, non-native wetland grass. The plant creates a thick accumulation of dead biomass that can produce high-intensity fires, threatening structures near wetlands and roadsides, particularly in late winter and early spring, due to its dense, tall, and dry stands.

Previous Occurrences:

There has not been a major wildfire in Shoreham or any of Vermont in the last 50 years, but small fires do occur relatively frequently. In the last decade, the average size of wildfires has been 1.72 acres and there were only 11 brush fires in all of Addison County in 2024. In July 2025 a wildfire in the town of Fair Haven, in neighboring Rutland County burned approximately 11 acres over 6 days before being contained by state and local firefighters. The cause of that fire remains unknown, but it occurred during a period of hot, dry, and windy conditions. A March 2026 fire in nearby Ferrisburgh burned about 100 acres of field, woods and swamp, as well as an outbuilding, and required assistance from 10 fire department crews to contain.

Most wildland fires occurring in vegetation or natural fuels in the area are caused by debris burning or campfires and are quickly reported and contained. A campfire that got out of control in Starksboro damaged just over 4 acres in an inaccessible area off Big Hollow, and a small campfire in Bristol burned about 2 acres. The Town Forest Fire Warden issues permits and local fire departments respond for wildland fire control with mutual aid assistance from other towns and the State, when necessary.

March 2026 Wildfire in Ferrisburgh, VT

The greatest impacts to communities from wildfires are smoke from wildfires in Canada and the western United States. This vulnerability is described in the Air Quality section of this plan.

Future Probability:
Although wildfires are currently uncommon in Vermont, the hazard committee acknowledged that extended periods of warming due to climate change have the potential to increase the occurrence of wildfire events. Unhealthy wildfire smoke from out-of-state wildfires is also expected to affect Vermont more frequently and severely in the future, as climate change is already increasing wildfire risks in the western United States and Canada. Changes in climate are expected to significantly increase the probability of wildfire events, if not in Shoreham, then in distant forested areas that still affect local atmospheric conditions.

Local land use changes are not expected to significantly affect their impact on community assets, but changing population demographics, especially aging populations, may create more vulnerability and compounding factors. For instance, older residents may have more breathing issues, or experience more social isolation. Limited numbers of volunteer fire fighters are available, especially for daytime and early evening hours when wildfires are most likely to be initiated, make response efforts challenging and reliant on mutual aid from neighboring communities.

Vulnerability Summary:

Populations that are more vulnerable to wildfire include firefighters, isolated residents, and immune-compromised individuals. Future assets are not expected to experience increases in vulnerability to wildfires due to land use changes or change in population demographics.

Wildfires are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 4.25 determined.

4.3.18 Lightning Storm (Vulnerability Score 3.75)

Location:

Severe storms which include lightning along with wind and rain events are a common occurrence in Shoreham during summer months. While unpredictable, lightning tends to be drawn to exposed areas of higher elevation or where there are sudden increases in elevation. Areas where elevation has resulted in more frequent lightning strikes are located along higher ridges. Lightning fatalities are most commonly associated with water-related activities such as fishing, boating, and swimming. Given Shoreham's location along Lake Champlain, victims are most likely to be located on the water. Another common strike location is at power line transformers.

Extent:

Based on data collected by NASA satellites between 1995 and 2002 there were between 4-6 strikes per square kilometer in western Addison County each year. These numbers would extrapolate to between 225 and 350 lightning strikes per year.

Lightning strikes routinely cause fires to trees along ridge tops in Vermont and less commonly start fires in structures. Fires associated with lightning strikes to inhabited buildings occur fewer than once every five years on average. More common is loss of power and damage to electronic equipment in homes where there has been a proximity strike. Anecdotally, there are multiple reports each year of electronic equipment unprotected by surge suppressors which are damaged by lightning strikes. Generally, these homeowners file insurance claims for damages and total annual damages in the entire community likely do not exceed $10,000.

Previous Occurrences:

The National Lightning Safety Institute has not recorded any known fatalities due to lightning in Vermont between 2016 and 2025. Given the estimated numbers of lightning strikes in Shoreham, unreported strikes on homes and other structure that result in fires are possible, but likely infrequent. In 2010 a lightning bolt struck the south side of the Newton Academy building, which housed a preschool and medical practice, and the resulting fire proceeded to take over the rest of the historic landmark. The building was believed to be the oldest secondary school still standing in Vermont. The building opened in 1810 and served as a private and public school until 1969. There were no injuries in the fire, which was reported just after midnight.

Future Probability:
Storm frequency and severity are predicted to increase which would likely cause more lightning strikes. The effect of strikes may be mitigated by the use of fire-resistant materials in new construction. Changes in climate are expected to slightly increase the probability of Lightning Strikes, but projected land use and population changes are not expected to affect their impact on community assets or vulnerable populations.

Vulnerability Summary:
Shoreham's susceptibility to lightning strikes seems to be relatively stable. The use of lightning rods has historically protected buildings from lightning-caused fires but these have fallen out of favor in recent years due to increased fire protection capability. The perceived risk of lightning strike in the community is relatively unchanged.
A lightning strike in the village center along Route 22A and Route 74 would likely cause the most disruption to the public, particularly if the Town Hall or municipal buildings were damaged or destroyed. Changes in climate may increase the intensity and frequency of lightning storms. Lightning strikes are unlikely to be affected by land use or demographic changes, or cause additional impact on community assets.

Lightning storms are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 3.75 determined.

4.3.19 Tornado (Vulnerability Score 3.50)

Tornadoes are violently rotating columns of air extending from a thunderstorm with wind speeds capable of reaching in excess of 250 mph.

Location:

High winds can affect the entire planning area. In Vermont, high winds are most often seen accompanying severe thunderstorms. In Addison County, these storms usually originate from the west, southwest, or south.

Extent:

Tornado damage paths can be more than mile wide and 50 miles long. Straight-line winds from thunderstorms are more common, but usually more limited in scale. (See Beaufort Wind and Saffir-Simpson wind scales in Appendix 4).

Previous Occurrences:

Since 1970 across Addison County, NOAA has documented damage from only 3 tornadoes, primarily during the spring and summer:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Tornado	0	0	1	0	0	0	2	0	0	0	0	0

*NOAA Storm event database (https://www.ncdc.noaa.gov/stormevents/)

Tornadoes can occur in Addison County, but are rare. In July 2022 a storm system produced two tornado touchdowns north of Shoreham: one in Addison (EF1) and one in Waltham (EF0). (See Enhanced Fujita Scale in Appendix 4). The tornadoes caused property damage, and uprooted and snapped several trees. The path length of the Addison tornado was 1 mile long and as much as 50 yards wide, while the second tornado path was 0.7 miles long and 25 yards wide.

Future Probability:

Tornadoes are not common in Vermont. However, it is likely that as climate change accelerates, the area will see exacerbation of wind events which could include tornadoes. Projected land use and population changes are not expected to significantly affect their impact on community assets or vulnerable populations, but may make such events more visible.

Vulnerability Summary:

People who live in rural, isolated communities like Shoreham are particularly vulnerable to windstorms. High winds can take down trees and power lines, resulting in blocked transportation routes, cut off electricity and telecommunication networks, and property destruction. Lack of electricity is life-threatening for those relying on electric life supports systems and electrical heating and cooling systems. In addition, isolated populations may have limited access to

information and communication resources that could prevent injury or death. Future assets are not expected to experience increases in vulnerability to tornadoes due to land use changes or change in population demographics.

Tornadoes are considered a **MODERATE PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 3.50 determined.

4.3.20 Landslide (Vulnerability Score 2.50)

Location:

Landslides are a variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, organic matter, or artificial fill. The materials may move by falling, toppling, sliding, spreading, or flowing and generally move in either a planar fashion, classified as translational, or curved, classified as rotational or slump. They can be as large as several cubic miles or as small as a few cubic meters and are able to move as quickly as a free fall or as slowly as a multi-century creep.

Landslides that move a significant amount of material quickly and over a large area have the capacity to cause substantial damage to infrastructure, buildings and the natural environment, as well as cause injuries and fatalities. Landslides can be the result of the following:

- Slope saturation from intense Rainfall/Snowmelt
- Oversteepening of slopes due to stream erosion or undercutting
- Invasive Species
- Reduction of material strength due to weathering.
- Addition of excess load onto slopes, often due to human activity.
- Earthquake or artificial vibration

Location:

Landslides in Vermont often involve unconsolidated materials and are most common along rivers where fluvial erosion occurs. In Shoreham, the modelled-areas of greatest landslide potential are around Palmer Road and Shacksboro Road. Field studies in 2016 found no High or Moderate Risk locations in Shoreham.

Figure. Landslide Potential in Shoreham (from Addison County Landslide Susceptibility, 2016)

Extent:

The impact that landslides can have is concentrated in limited areas, but can have significant impacts on the built and natural environment. Landslide events can quickly and significantly alter topography with massive amounts of debris moving downslope. Roads that sit along steep slopes near rivers are especially vulnerable to damage or complete failure from a landslide event. Bridges and culverts placed near waterways similarly can be damaged or swept away by the debris of a landslide. Buildings and other structures can be damaged as well, especially if they are in historical landslide sites, steep slopes, slopes altered by construction, channels along streams or rivers, and areas where humans have directed surface runoff. Slope instability is further exacerbated by human activity, often in the form of infrastructure construction that either mishandles surface runoff, overloads the tops of slopes, or undercuts the bases of slopes. The destruction of roadways can limit the transportation corridors in distant areas, making it difficult to respond to emergencies caused by landslides as well as other emergencies.

Landslides can also significantly impact the natural environment. Landslide debris can impact the character and quality of rivers and groundwater flow when large amounts of earth and organic materials enter streams as sediment resulting from landslides and erosion activity, thus reducing the potability of the water and quality of habitat for fish and wildlife. Sedimentation can lead to

many waterway issues by clogging fish gills, reducing resistance to disease, lowering growth rates, and affecting fish egg and larvae development. Increased turbidity of the water can prevent the growth of vegetation disrupting the Biochemical Oxygen Demand (BOD) of the water, making it more difficult for marine species to breathe. The habitat destruction and disruption caused by landslides is not confined to waterways, as forested ecosystems in the path of a landslide can be swept away, stripping forest cover away, impacting wildlife habitat. The changes in the natural environment experienced by this hazard are fast acting and severe, requiring time for ecosystems to recover and topography to stabilize.

Previous Occurrences:

Vermont has recorded over 3,000 landslides, with many occurring in the northern and central parts of the State along the spine of the Green Mountains. These regions are often sparsely populated, but storms in July 2023 dropped several inches of rain over 3-days, and continued rain over the following days and weeks that added to already saturated soils, flooding rivers, and at-capacity dams. The storm caused numerous landslides, road closures, and home damages. State scientists evaluated more than 70 fallen slopes and potential landslides after the summer floods — unprecedented in recent history. There were no landslides documented in Shoreham from that storm event. The only landslide documented was an area next to Buttolph Rd

Figure. Screenshot of all documented landslides in Shoreham
(https://gis-vtanr.hub.arcgis.com/datasets/landslides/)

Future Probability:
Widespread landslides are harder to predict and prevent than flooding. Unlike floods, there isn't necessarily a straight-line connection between the amount of rainfall and landslides. Vermont-specific work indicates that 3 to 5 inches of precipitation can trigger failures that lead to landslides, particularly in areas of steep slopes when the ground is already saturated. Extreme weather events and an expected increase in precipitation caused by climate change could make landslides more common in Vermont. While landslides in Shoreham are unlikely, they are potentially a concern along steep stream gulleys.

Vulnerability:
Extreme weather events and the expected increase in precipitation caused by climate change could make landslides more common in Shoreham.

Landslides are considered a **LOW PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 2.50 determined.

4.3.21 Inundation Flooding (Vulnerability Score 2.25)

Location:

Minor inundation flooding is a regular occurrence in Shoreham. The 1% annual chance of flooding Special Flood Hazard Area (aka 100-year floodplain) identified by FEMA is primarily around the Shoreham Swamp and along the Lemon Fair River in the eastern side of town (see **2.2.5. Flood Resiliency Map, page 20 and Appendix**). There is regular flooding in the low-lying area along Route 74. Minor shoreline flooding may occur in Shoreham when the Lake Champlain water level exceeds 101' above sea level. Water levels can also rise due to backflow along small tributaries that flow directly into Lake Champlain.

Figure. Lake Champlain Basin Lidar-Informed Flood Inundation recurrence intervals

Extent:

All structures and residences in Shoreham are located well above known floodplains and above the highest recorded lake flooding level of 103', so little if any damage affects private property. Erosion of the clay soils of the lakeshore is a known hazard, and many private landowners have undertaken shore stabilization measures.

Previous Occurrences:

Much of Shoreham is relatively flat and its main waterway— the Lemon Fair River—rises every spring through agricultural fields, so there has been no development in those areas. As a result, inundation flooding has not historically affected Shoreham and there have been no recent incidents.

Future Probability:

Flood hazard areas for Shoreham and all of Addison County are currently being updated by USGS for FEMA and are expected to be finalized by 2027. The Zoning Administrator implements the substantial improvement/substantial damage provisions of the town's floodplain management regulations by prohibiting substantial improvement and post-event repairs that will result in any increase in flood levels. All new construction and substantial improvements require the granting of a conditional use permit. Changes in climate and high rainfall events may increase the probability of inundation flooding events, but land use and development changes are not expected to affect their impact on community assets or vulnerable populations.

Vulnerability:

The Town of Shoreham, with its historic development patterns and large wetland areas, is relatively inundation flood-safe. Future assets are not expected to experience increases in vulnerability due to land use changes or change in population demographics.

Inundation Flooding is considered a **LOW PRIORITY** for the Town of Shoreham, with an overall vulnerability score of 2.25 determined.

5. Community Mitigation Strategies

5.1 Hazard Mitigation Goals by Hazard Type

Requirement 44 CFR § 201.6(c)(i)
(Goals to reduce vulnerability to Hazards)

The Town of Shoreham has identified that its goals for hazard mitigation are to reduce vulnerabilities to the hazards identified in section 4.3 and mitigate their potential harmful effects. In doing so, it also recognizes that political will and lack of funding stand in the way of many mitigation projects. The town particularly supports local residents' efforts to mitigate their personal risks. The Town also supports projects that lead to a positive benefit vs. cost evaluation and which the voters can afford.

Goal 1: Increase Individual Awareness of Shoreham's Vulnerability to Natural and Human-influenced Hazards and work towards developing a Social Resilience Ethic.

Objective: Inform and educate the community about the types of hazards the Town of Shoreham is exposed to, where they occur, and recommended pro-active actions.

Goal 2: Reduce Vulnerability of People, Property, and the Environment to Natural and Human-influenced Hazards

Objective: Provide mechanisms to enhance life safety and well-being of all persons.
Objective: Reduce impacts to critical facilities and services.
Objective: Reduce impacts to existing municipal buildings and transportation infrastructure.
Objective: Plan for and reduce hazard impacts to future development and infrastructure.
Objective: Reduce impacts to the town's natural, economic, and historic resources .
Objective: Reduce impacts to public health and improve access to regional health resources.

Goal 3: Increase Interagency Coordination to Reduce the Impacts of Natural and Human-influenced Hazards

Objective: Continue to collaborate and coordinate with other municipalities and state agencies on planning, projects, hazard response, and funding opportunities.

5.2 Authorities, Policies, Programs, Resources

Requirement 44 CFR § 201.6(c)(3)
(Existing capabilities and ability to expand)

5.2.1. Authorities of Town Officials:

Selectboard: The Selectboard is responsible for the basic administration of the town. They take care of roads, make appointments to other boards and commissions, and authorize expenditures of voted budgets. The Selectboard may enact ordinances and rules in many areas including traffic regulation, regulating nuisances, managing solid waste, dogs and recreation, and establishing bike paths.

Planning Commission: The Planning Commission is responsible for long range planning in a town particularly as it relates to future land uses and resilience. They prepare a municipal plan and zoning bylaws which are adopted by the Selectboard. Planning Commission members are appointed by the Selectboard.

Zoning Administrator: The Zoning Administrator (ZA) is appointed by the town's Selectboard with consideration given to the recommendation of the planning commission. Their responsibilities include administration and enforcement of a town's zoning bylaws. The ZA and usually also serve as the administrator of town floodplain regulations.

Tree Warden: The Town Tree Warden is responsible for the shade and ornamental trees within the town rights-of-way. They oversee tree health and removal when necessary. The tree warden is appointed by the Selectboard.

Fire Warden: The Town Forest Fire Warden has the responsibility for suppression of wildland fires, regulating open burning in the town by issuing burn permits, and wildfire education/prevention. The Town Fire Warden is appointed by the state Commissioner of Forests, Parks and Recreation with approval by the town's Selectboard.

Health Officer: The Town Health Officer is the executive officer of the local Board of Health.
A local board of health may make and enforce rules and regulations relating to the prevention, removal, or destruction of public health hazards and the mitigation of public health risks. The Town Health Officer is appointed by the Commissioner of Health with approval by the local Selectboard. They take direction from the state Department of Health in investigation and enforcement of public health issues.

Emergency Management Director: By default, the town's Selectboard chair is the town's emergency management director (EMD) unless one is appointed. Many communities retain the authorities of an EMD within the Selectboard and appoint an emergency coordinator instead. The emergency manager is responsible for the organization, administration and operation of the local emergency management organization. Emergency managers prepare local emergency operations plans, coordinate a local emergency management group and perform emergency management functions at the local level.

5.2.2. Current policies, programs, resources

The 2016 Shoreham town plan integrated information from the previous hazard mitigation plan into the Flood Resilience section, where it noted vulnerable locations and supported the adoption of river corridor protections and the adoption of updated FEMA special flood hazard areas. Emergency-preparedness improvements were noted in the Community Facilities and Services section, Housing section, and the Transportation section, as well as in the Goals for each topic. The following programs and resources are currently in place to mitigate the following hazards:

Widespread Power Failure

Many essential Town facilities like the Town Office, Fire Department and Town Garage have power generators for maintaining electric power. Many private residences have back-up power sources and batteries.

As population growth and housing expands along remote road corridors, increasing reliance on dependable power by the new homeowners requires changes in line maintenance. Green Mountain Power (GMP), the utility servicing the Town of Shoreham has an ongoing program of line clearing and relocation to ensure outages are kept to a minimum. In addition, recent improvements to the transmission system in northwest Vermont have provided redundant systems to bring electric power to the region.

Flash Flooding

The Town of Shoreham adopted the 2013 version of road and bridge standards as recommended by VT AOT on June 26, 2019. These standards address road and bridge construction, are designed to mitigate local traffic issues and are particularly designed to mitigate potential damages due to flooding and flash flooding. The standards address culvert sizing, ditch treatments and driveway access to reduce flood-caused erosion. The town supports the Vermont Culvert Database by updating records whenever they replace or upgrade culverts. The town requires stormwater permits and for commercial and industrial development, stormwater management and erosion control plans are required. Current Unified Development Regulations require that changes in grading are done so that drainage does not cause ponding, flooding, or siltation of other properties. Changes to natural drainage patterns are not allowed to alter wetlands or stream flow. The town adopted River Corridor bylaws in the 2024 Unified Development Regulations.

Winter Snow Storm & Ice Storm

Mitigation activities by power companies have re-routed many of the remote lines along town highways since the 1998 ice storm and an increased pruning effort has reduced the impact of a similar event would it happen today. The Town of Shoreham generally mitigates its winter storm risk through preparedness activities in the form of appropriately sized equipment and training. All improvements to the road system take into account ease of snow removal in design

High Winds

In order to mitigate power outages and residential structures, the town road crew removes or prunes damaged trees in town road rights of way to reduce their vulnerability to high wind events. All modular, or mobile/manufactured dwellings must be installed on a proper foundation

sufficient to ensure their stability and security and Newly constructed buildings may have tie downs between roof and side walls but no building codes exist within the community that require construction to any particular standard.

Structure Fire

All new structures require Fire Marshall Safety permits and adequate water storage or distribution facilities for fire protection are required within new subdivision. Installation of dry hydrants at water supply locations increases the availability of and speed in which water can be accessed for firefighting purposes. The Town of Shoreham maintains and tests these hydrants and would support additional installations as funding permits and suitable locations can be identified.

Insect-Borne lllness

Shoreham has a high percentage of its land mass in frequently flooded soils and abandoned farmlands. These lands are home to insects, some of which also carry arboviruses. The town is not a member of the nearby Lemon Fair Insect Control District which requires an annual monetary contribution toward the district's efforts to keep insect populations in check. The Town supports efforts by the Vermont Department of Health in educating the population.

Wildfire

Shoreham has an active fire department and a fire warden who requires permits prior to any outdoor burning in the town. This process includes site visits to a proposed burn site and a subsequent issuance of a permit. Enforcement is usually limited to a warning if the fire seems lit out of ignorance and can result in fines if the fire department is called out.

The town has no guidelines for home construction in place that would limit the risk of wildfire in Shoreham. Actions taken as described above should limit the setting of uncontrolled outdoor fires and should result in an overall limited risk. Fire ponds may be required in larger developments, which should mitigate future fire risk in those developments.

Large-Scale Hazardous Materials Incident

The Shoreham Fire Department conducts annual and has mutual aid agreements with neighboring Fire Departments through the Addison County Fire Association. The departments each maintain HazMat Decontamination supplies and members undergo annual HazMat Awareness certification. The State HazMat team responds to larger incidents.

Inundation Flooding

The Town has been a member in good standing of the National Flood Insurance Program (NFIP) for over 30 years. There are no identified "Repetitive Loss" properties located in Shoreham. One flood insurance policy is in effect for a residence in the town located in the identified flood hazard zone, but no critical or public structures are located in the 1% or 0.2% flood hazard areas. The Town supports continued compliance with the NFIP.

5.2.3. Current resources

The Town of Shoreham's annual budget is slightly less than $500,000 annually with additional highway budget of just over $1 million. Receipts are primarily from property taxes, with less than 1% from grant incomes, fines fees and licenses, zoning permits, and other sources of income.

The town's budget is structured to address various operational and community needs. Key allocations include:

- General Fund: Covers administrative expenses, including salaries for town officials, office supplies, and other operational costs.
- Public Safety: Funds allocated for fire protection services, emergency medical services and law enforcement (Addison County Sheriff) support.
- Public Works: Includes road maintenance, snow removal, and infrastructure repairs.
- Health and Welfare: Supports health officers, animal control, and contributions to health-related organizations.
- Recreation and Culture: Funds for community events, library services, and historical preservation.
- Debt Service: Payments on any outstanding municipal debts.

The budget also outlines anticipated revenues from property taxes, state aid, and other local sources to balance expenditures.

Grants and Funding Sources

Shoreham actively seeks external funding to supplement its budget. Notable grants and funding sources include:

- State and Federal Grants: Applications submitted for infrastructure improvements and community development projects.
- Donations and Contributions: Received from local organizations and residents to support specific initiatives.
- Intergovernmental Transfers: Funds from county or state agencies for designated programs.

To enhance Shoreham's resilience against natural hazards, the town may consider applying for the following grants:

- Hazard Mitigation Grant Program (HMGP): Provides funding for projects that reduce disaster risk, such as infrastructure upgrades and property buyouts.
- Building Resilient Infrastructure and Communities (BRIC): Supports proactive mitigation projects, including planning and code enforcement activities.
- Flood Mitigation Assistance (FMA): Offers grants for flood risk reduction projects, particularly for properties insured under the National Flood Insurance Program.
- Community Development Block Grant - Disaster Recovery (CDBG-DR): Funds long-term recovery efforts in areas affected by significant disasters, focusing on infrastructure and housing restoration.

To be eligible for these grants, Shoreham must maintain an updated Local Hazard Mitigation Plan, be in good standing with the National Flood Insurance Program, and have an adopted Local Emergency Operations Plan.

By leveraging these funding opportunities, Shoreham can proactively address potential hazards and enhance the community's safety and resilience.

5.2.4. Authority and Capabilities to Expand Funding

As a small town governed by a Selectboard and annual Town Meeting, the Town of Shoreham has limited authority and capacity to expand its funding capabilities independently. However, it does have some tools and options within its municipal authority:

- **Property Tax Adjustments**: The town can propose and approve increases to property tax rates through the Town Meeting process, allowing for additional revenue—though this depends on voter support and is often constrained by affordability concerns in a small population.
- **Grant Applications**: Shoreham has the authority to pursue state and federal grants, and its annual report indicates it does so. Successful grant-seeking depends on administrative capacity, competitive proposals, and alignment with state and federal priorities.
- **Special Assessments and Fees**: The town can levy fees or create special assessment districts for specific projects (e.g., road improvements), though this is rare in small rural towns.
- **Intergovernmental Partnerships**: Shoreham can collaborate with neighboring towns or regional planning commissions (e.g., Addison County Regional Planning Commission) to access shared services, technical assistance, and larger funding pools.

Limitations:

- **Administrative Capacity**: Small towns like Shoreham often lack full-time staff, grant writers, or dedicated financial planners, limiting their ability to aggressively pursue or manage complex funding streams.
- **Revenue Base**: With a small population and limited commercial activity, Shoreham's tax base is modest, restricting local revenue potential.
- **Regulatory Constraints**: State laws cap certain forms of taxation or borrowing, and voter approval is typically required for new spending or debt.

In summary, Shoreham has some municipal authority to improve its funding, especially through voter-approved measures and grants, but its small size and limited resources pose real constraints on expanding its financial capabilities. Collaborating regionally and leveraging state/federal programs are the town's most viable paths to increased funding.

5.3 Project Prioritization Process

Projects and actions included in Section 5.2 are conducted by the Town of Shoreham, GMP or regional and State agencies where noted. The Town encourages its residents to adopt mitigation actions which could protect their personal property by making educational materials available to residents. Mitigation actions identified in Section 5.4, are considered the jurisdiction's priority mitigation actions.

The Town has established the following priorities for choosing mitigation projects: Life safety and the safety of its residents, keeping local roads and bridges open to ensure access for emergency vehicles, and protecting critical infrastructure facilities in the town. These actions/projects are constantly evaluated for benefit to the community, estimated project cost and political will to implement and will be implemented as those factors indicate. Several mitigation projects have been completed in the past five years, and additional work is underway. The Town has established that costs considered are primarily financial, however there are political and social costs considered depending on the action.

The actions identified in Section 5.4 under each hazard have passed a preliminary evaluation utilizing those general concepts by the hazard mitigation committee, and are listed in their order of priority. Before undertaking these projects, they will additionally be prioritized based on their feasibility and a benefit vs. cost review. A minimum C/B result of 1.0 will be required prior to any request for federal mitigation funds. All projects in section 5.4 will be reviewed for progress following any local disaster declaration and will be considered annually as part of overall town budgeting.

Requirement 44 CFR § 201.6(c)(d)(3)
(Revisions due to priorities changes)
Requirement 44 CFR § 201.6(c)(3)(ii)
(Range of actions and projects considered

5.4 Hazard Mitigation Goals by Hazard Type

The following list of proposed mitigation actions and projects was revised from the previous plan due to changes in community priorities. The Hazards Committee identified a comprehensive range of specific mitigation actions from the previous Hazard Mitigation Plan, the State Hazard Mitigation Plan, and the goals and actions of neighboring municipalities, and analyzed each. Projects were considered to reduce the effects of each priority hazard, with emphasis on human life and safety as well as consideration of the new and existing buildings and infrastructure.

The final list includes only those projects which could be considered reasonable and feasible based on cost and political willingness. The town will maximize 406 mitigation opportunities whenever possible when making repairs to Public Assistance eligible damages during a declared disaster.

Each project in this action plan includes an estimated cost, possible funding sources, potential benefits, the lead person or agency responsible for completion of the project and an estimated start and end timeframe for project completion. Timeframes are an estimate only and are dependent upon funding and the political will to complete.

5.4.1 Mitigation Actions by Hazard Type Table

Hazard	Suggested mitigation action(s) for this hazard?	Estimated Cost	Source of Funds	Responsibility	Time-frame	Priority
All-Hazards	Provide community information on Preparation Kits and Go-Bags, in coordination with school community in coordination with Bridport	None to Town	Volunteer Time	Em. Management Director	2027-2030	**High**
Severe Heat	Maintain Library & Congregational Church as emergency heating/cooling shelter with generator and air-conditioning	$10,000	State grants	Select Board	2026-2031	**Medium**
	Encourage residents to sign up for the CARE registry and set up a process to check on vulnerable populations during heat events	None to Town	Volunteer Time	Em. Management Director	2026-2028	**Medium**
	Develop and implement a Hot Weather-Cooling Shelter plan	None to Town	Volunteer Time	Em. Management Director	2026-2028	**Medium**
	Assess role of elementary school as a resilience hub and community resource	None to Town	Volunteer Time	EMD & Planning Commission	by 2030	**Low**
	Identify a regional shelter and develop MOU for opening procedures	None to Town	Volunteer Time	Em. Management Director	by 2030	**Medium**
Widespread Power Failure	Maintain the back-up generator for the Town Office, Road building, and Fire Department.	$2000/yr	Town budget	Select Board	2026-2031, Ongoing	**High**
	Add generator capability to town library building	$5,000	State grants	EMD and Library	by 2030	**High**
	Encourage and support GMP undergrounding of major electrical lines	None to Town	N/A	Green Mountain Power	2026-2031, Ongoing	**Medium**
	Support installation of residential energy storage/generators	None to Town	N/A	Energy Coordinator with support of EMC	2026-2031, Ongoing	**Medium**
	Provide education about preparation and safety for power outages	None to Town	N/A	Energy Coordinator with Efficiency VT	2026-2031, Ongoing	**Medium**
Highway Accident	Planning Commission will request increased input/review about apparatus access from the fire department on development applications.	None to town	Zoning Admin. time	Planning Commission	2026-2031	**Medium**
	Request improvements to lines of sight at the Doolittle Road-Route 22A high risk intersection	Unknown	State of Vermont VTrans	VTrans	by 2031	**Medium**
	Support lower speed limit on portions of Route 22A and Route 74	Unknown	State of Vermont VTrans	VTrans	by 2031	**Medium**

Hazard	Suggested mitigation action(s) for this hazard?	Estimated Cost	Source of Funds	Responsibility	Time-frame	Priority
Structure Fire	Maintain dry hydrants throughout town.	$1000-$5000	Rural Fire Protection Grant Program	Shoreham FD	2026-2031, Ongoing	**Medium**
	Provide Fire Safety education program in the elementary school	None to town	Volunteer Time	Shoreham FD	2026-2031, Ongoing	**Low**
	Maintain driveway standards in zoning bylaws to support basic accessibility for emergency vehicles to all structures in town and add hydrant requirements for new developments.	None to town	Zoning Administrator time	Planning commission	2028	**Medium**
	Acquire compressor for refilling Self-Contained Breathing Apparatus (SCBAs)	$20,000	Grants and Fundraising	Shoreham FD	2030	**High**
Invasive Species	Follow state recommendations for roadside mowing to prevent seed production of Poison Parsnip	None	N/A	Town Road crew	2026-2031, annually	**Medium**
	Support Phragmites management plan for limiting growth in wetland areas near village	None	Volunteer Time	Future Conservation Commission	2030	**Medium**
	Provide education and monitoring of Ash Trees and Emerald Ash Borer damage.	None	Volunteer Time	Future Conservation Commission	2030	**Medium**
High Winds	Remove dead and dying trees from town rights of way as part of normal maintenance	$5,000	Town highway budget	Town road crew,	2026-2031, Ongoing	**High**
	Support GMP efforts to maintain rights of way and bury power lines	None	N/A	GMP	2026-2031, Ongoing	**Medium**
Severe Cold	Maintain school gym as emergency heating shelter with generator	$10,000	State grants	Select Board	2026-2031	**High**
	Encourage residents to sign up for the CARE registry and set up a process to check on vulnerable populations during severe cold events	None to Town	Volunteer Time	Em.Management Director	2026-2028	**Medium**
	Develop and implement a Warming Shelter plan and a Memorandum of Understanding (MOU) with the School District.	None to Town	Volunteer Time	Em.Management Director	2026-2028	**Medium**
Severe Snow Storm	Identify appropriate shelters for people who may need to evacuate due to loss of electricity, isolation, cold temperatures	None to Town	N/A	Em.Management Director	2026-2031	**Medium**
	Maintain snow removal equipment and qualified personnel	$50,000	Town highway budget	Town road crew	2026-2031, Ongoing	**High**
	Work with private landowners to encourage construction of wind/blow rows	None to Town	Volunteer Time	Em.Management Director	2026-2028	**Medium**

Hazard	Suggested mitigation action(s) for this hazard?	Estimated Cost	Source of Funds	Responsibility	Time-frame	Priority
Drought	Encourage reporting by residents with dry wells	None to Town	Volunteer Time	Em. Management Director	2026-2031, Ongoing	**High**
	Provide education to residents about water conservation measures	None to Town	Volunteer Time	Em. Management Director	2026-2031, Ongoing	**High**
	Work with Tri-Town Water District on vulnerability assessment	None to Town	Volunteer Time	Em. Management Director	By 2030	**High**
Flash Flooding & Fluvial Erosion	Fund attendance by the Zoning Administrator at NFIP trainings when offered locally	$300	Town operating Budget	Zoning Administrator	2026-2031	**Medium**
	Evaluate the benefit vs. cost for entry into the Community Rating System of the NFIP	None	N/A	Planning Commission	2027	**Medium**
	Include additional flood resiliency language in the current update of the Town Plan	None	N/A	Planning Commission	2026	**High**
	Evaluate the adoption of updated flood hazard areas and river corridor regulations in zoning updates.	None to Town	Volunteer Time	Planning Commission	by 2028	**High**
	Pursue specific road projects identified in the town road network system to be implemented as funding allows:					
	Replacement of small (bridge) structure on Doolittle Road	>$700,000	Federal grants	Select Board, Road Foreman	2027-2028	**High**
	Richville Road culvert replacement	$50,000	Town Funds	Road Crew	by 2030	**Medium**
	Lake Street culvert replacement	$50,000	Town Funds	Road Crew	by 2030	**Medium**
	Implement Road Erosion Inventory & Municipal Road Grant Program, Stone Line ditches when work is being completed on any road.	Varies by project	Town highway budget	Town Road Crew	2026-2031, Ongoing	**High**
	Require driveway drainage design standards in Zoning	None to Town	Volunteer Time	Planning Commission	by 2028	**Low**
	Provide landowner education for maintaining driveway culverts	None to Town	Volunteer Time	Road Crew & Em. Management Dir.	2026-2031, Ongoing	**Low**
Air Quality	Provide air quality and health information to residents and provide community education and outreach around air quality concerns.	None to Town	Volunteer Time	Em. Management Director	2026-2031, Ongoing	**Medium**
	Maintain town supply of N95 masks and offer to residents	None to Town	State funding	Em. Management Director	by 2027	**Medium**
	Provide indoor shelter with filtered air systems	$5,000	Grant funding	Em. Management Director	by 2028	**High**

Hazard	Suggested mitigation action(s) for this hazard?	Estimated Cost	Source of Funds	Responsibility	Time-frame	Priority
Severe Ice storm	Support efforts by Green Mountain Power to mitigate power outages due to ice storms via pruning and tree removal activities.	None	N/A	Select Board	2026-2031, Ongoing	**Medium**
	Manage vegetation in the ROW to allow space for powerlines.	$5000/yr	Town highway budget	Town Road Crew	2026-2031, annually	**High**
Insect-and-Tick-borne Illness	Provide mosquito-safety educational materials on the use of appropriate repellants and behavior patterns which reduce the likelihood of mosquito bites.	None to Town	Volunteer Time, ACRPC fee	Em. Management Director	2026-2031, Ongoing	**High**
	Support efforts to reduce standing water in yards and tires.	None to Town	Volunteer Time	Em. Management Director	2026-2031, Ongoing	**Medium**
	Provide tick-identification and safety educational materials to residents.	None to Town	Volunteer Time, ACRPC fee	Em. Management Director	2026-2031, Ongoing	**Medium**
Large-scale Hazardous Materials Spill	Support ongoing HazMat training efforts of the Shoreham Volunteer Fire Department.	None to Town	Volunteer Time	Shoreham FD	2026-2031, Ongoing	**High**
	Support continued Tier II annual hazardous materials storage reporting.	None to Town	Town staff time	Town Road Crew	2026-2031, Ongoing	**Medium**
Infectious Disease Outbreak (Pandemic)	Support training of the Town Health Officer to help mitigate the effects of a pandemic.	$500	Town operating Budget	Town Health Officer	2026-2031	**Medium**
	Prepare an agricultural emergency response plan for local farms and provide information to farmworkers.	None to Town	Volunteer Time	Emergency Mngmt Coordinator	2026-2031	**Medium**
	Develop and maintain continuity planning and agreements for potential town staff shortages.	None to Town	Volunteer Time	Emergency Mngmt Coordinator	2026-2031	**High**
Hail Storm	Provide hail-safety education materials on the ACRPC website.	None to Town	Volunteer Time, ACRPC annual fee	ACRPC	2026-2031, Ongoing	**Low**
Wildfire	Require outdoor burn permits prior to any outdoor burning.	Annual stipend	Town operating Budget	Town Fire Warden	2026-2031, Ongoing	**High**
	Support Fire Department wildfire training and equipment, including purchase of brush truck.	$45,000	Fundraising, grants	Shoreham FD	2026-2031, Ongoing	**Medium**
	Maintain dry hydrants throughout town.	$1000-$5000	Rural Fire Protection Grants	Shoreham FD	2026-2031, Ongoing	**Medium**

Hazard	Suggested mitigation action(s) for this hazard?	Estimated Cost	Source of Funds	Responsibility	Time-frame	Priority
Wildfire (continued)	Create a Community Wildfire Protection Plan	None to Town	State Grant funds Vol. time	Shoreham FD	2027-2029	**Medium**
	Provide educational materials on "firewise" practices on the ACRPC website	None to Town	Volunteer Time, ACRPC fee	ACRPC	2026-2031, Ongoing	**Medium**
Lightning Storm	Provide lightning-mitigation education materials on the ACRPC website	None to Town	Volunteer Time, ACRPC fee	ACRPC	2026-2031, Ongoing	**Low**
Tornado	Remove dead and dying trees from town rights of way as part of normal maintenance	$5,000	Town highway budget	Town road crew	2026-2031, Ongoing	**Medium**
	Encourage residents to sign up for VT-Alert to receive early weather warnings	None to Town	Volunteer Time	Emergency Mngmt Coordinator	2026-2031	**High**
	Provide tornado-safety education materials on the ACRPC website.	None to Town	Volunteer Time, ACRPC fee	ACRPC	2026-2031, Ongoing	**Low**
Landslide	Consider incorporating state geologist review into future development permitting.	None to Town	Volunteer Time,	Planning Commission	2026-2031, Ongoing	**Low**

5.5 No Previous Mitigation Plan with Actions to Update

Requirement 44 CFR § 201.6(d)(3)
(Update on previous mitigation actions)

6. Plan Maintenance Procedures

A Hazard Mitigation Plan is dynamic and should not be fixed. To ensure that the plan remains current and relevant, it is important that it be updated periodically. The plan will be integrated into other plans and updated at a minimum every five years.

6.1 Hazard Mitigation Plan Integration

Requirement 44 CFR § 201.6(d)(3)
(Process of mitigation plan integration)
Requirement 44 CFR § 201.6(c)(4)(ii))
(Integration process and planning mechanisms)

The municipality will integrate the goals and actions of this hazard mitigation plan into all other municipal planning mechanisms, including the annual Local Emergency Management Plan, annual municipal budget, and Shoreham Municipal Plan (re-adoption currently in progress). The Emergency Management Director and Emergency Management Coordinator will be responsible for integrating the goals, information and strategy of the mitigation plan into other planning mechanisms

6.2 Hazard Mitigation Plan Review/Update Process

1. The Shoreham Selectboard assembles a Review/Update Committee to include government officials and interested public.
2. The Committee will discuss the process to determine if any modifications or additions are needed due to changing conditions since the last update occurred. Data needs will be reviewed, data sources identified and responsibility for collecting/updating information will be assigned to members.
3. Other Town plans (Emergency Management Plan, Town Plan, Road Plan, etc.) will be reviewed to ensure a common mitigation thread still exists throughout.
4. A draft update will be prepared based on these evaluation criteria:
   - Changes in community and government processes, which are hazard-related and have occurred since the last review.
   - Progress in implementation of plan initiatives and projects.
   - Effectiveness of previously implemented initiatives and projects.
   - Evaluation of unanticipated challenges or opportunities that may have occurred between the date of adoption and the date of the report.
   - Evaluation of hazard-related public policies, initiatives and projects.
   - Review and discussion of the effectiveness of public and private sector coordination and cooperation.
5. The public will be invited to review and give input on drafts as they are produced.
6. Selectboard members will have an opportunity to review the draft update. Consensus will be reached on any changes to the draft.
7. The Selectboard will notify and schedule a public meeting to ensure adequate public input.
8. The Selectboard will recommend incorporation of community comments into the draft update.

Requirement 44 CFR § 201.6(c)(4)(i)
(Monitoring, Evaluating, and Updating)

6.3 Mitigation Project Status Monitoring and Evaluation

The town of Shoreham has outlined a process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy. The plan will be reviewed and updated in its entirety at least every five years as described in Section 6.2 above, the Town will monitor and evaluate its hazard mitigation goals, strategies and actions/projects annually as the town budget is created. A town budget is created by the Selectboard of a town in publicly noticed meetings utilizing budget requests from town committees and the citizenry. This will ensure that progress will be reviewed and actions/projects either added or removed from the towns work plan based on changing local needs and priorities. In creation of the municipal plan by the planning commission, concepts, goals and strategies from this plan will be used to inform the development of that plan and will be incorporated into that plan when appropriate. The progress/status of the mitigation actions identified within the mitigation strategy will be tracked by the Selectboard and Emergency Management Coordinator, who will be responsible for this process and bring mitigation actions to other planning processes. The plan will be evaluated for effectiveness annually and post-disasters (see section 6.5).

Requirement 44 CFR § 201.6(c)(4)(iii)
(Future public participation)

6.4 Public Participation

This Hazard Mitigation Plan solicited and received public input, especially in developing the hazard risk and vulnerability assessment. The municipality will continue to encourage future public participation in mitigation actions after the plan has been approved. Notice of the plan will be made and a copy of the plan along with contact information will be made available on the town website and at the Town Office. While the public are encouraged to read and comment on the plan, the committee understands that the length of the plan following all FEMA requirements is unwieldy and time-consuming for review, and has therefore provided a concise executive summary to provide the main Vulnerabilities, Goals and Mitigation actions The Emergency Management Director and Emergency Management Coordinator will provide a status report on mitigation action progress at the annual Town Meeting and provide information on potential weather-hazards via local networks including Front Porch Forum. Public comments and suggestions will be recorded and incorporated into the upcoming hazard mitigation plan.

6.5 Post-Disaster Review Procedures

Should a declared disaster occur, a special evaluation process will occur in accordance with the following procedures:

1. Within six (6) months of a declared emergency event, the Town will initiate a post disaster review and assessment of actions.
2. This post disaster review and assessment will document the facts of the event and assess whether the existing Hazard Mitigation Plan effectively addressed the hazard.
3. A report of the review and assessment will be created by a Review/Update Committee.
4. The committee will make a determination whether the plan needs to be amended. If the committee determines that NO modification of the plan is needed, then the report is distributed.
5. If the committee determines that modification of the plan IS needed, then the committee drafts an amended plan based on its recommendations and forwards to the Selectboard for their input.
6. Following completion of a public input process, further amendments may be made and a final plan delivered to the Selectboard for adoption.
7. The Selectboard adopts the amended plan.

7. Plan Adoption Resolution

Requirement 44 CFR § 201.6(c)(5)
(Documentation of adoption)

TOWN OF SHOREHAM, VERMONT SELECTBOARD ADOPTION RESOLUTION

WHEREAS, the Town of Shoreham has occasionally experienced severe damage from natural hazards and it continues to be vulnerable to the effects of the hazards profiled in the **Town of Shoreham, Vermont Single Jurisdiction All-Hazards Mitigation Plan (The Plan)**, which can result in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of TOWN has developed **The Plan** and received conditional approval from the Federal Emergency Management Agency (FEMA); and

WHEREAS, **The Plan** identifies specific hazard mitigation strategies, and plan maintenance procedures applicable to the Town of Shoreham; and

WHEREAS, **The Plan** identifies actions and/or projects intended to provide mitigation for specific natural hazards that impact the Town of Shoreham; and

WHEREAS, adoption of **The Plan** will make the Town of Shoreham eligible for additional funding to help alleviate the impacts of future hazards;

Now, therefore, be it RESOLVED by Town of Shoreham Selectboard:

1. The **Town of Shoreham, Vermont Single Jurisdiction All-Hazards Mitigation Plan** is hereby adopted as an official plan of the Town of Shoreham, Vermont. While content related to Shoreham may require revisions to meet the plan approval requirements, changes occurring after adoption will not require Shoreham to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions;

2. The respective Town officers identified in the action plan are hereby directed to pursue implementation of the recommended actions assigned to them;

3. Support agencies within the Town of Shoreham are also requested to implement actions assigned to them within this plan;

4. Plan maintenance procedures described in Section 6 of this plan are also adopted as part of this resolution.

IN WITNESS WHEREOF, the undersigned have affixed their signatures for the Town of Shoreham, this ____ day of _____ 2026.

_____	_____	_____
Selectboard Chair	Selectboard Member	Selectboard Member

ATTEST:_____

Appendix 1. Public Outreach

Poster displayed at Town Meeting, March 2025 and at Shoreham Library

The following organizations were asked for feedback on the draft hazard mitigation plan and proposed mitigation actions:

- Community Health Shorewell
- Addison County Community Action Group,
- Addison County Home Health and Hospice,
- Tri-Valley Transit,
- Champlain Valley Agency on Aging,
- Counseling Service of Addison County,
- Elderly Services,
- the Open Door Clinic,
- Vermont Adult Learning
- Atria Collective (WomenSafe)
- Community Health Shorewell
- Green Mountain Power
- MREMS

Online Survey Responses

The online survey received 9 responses from Shoreham residents, and the poster received multiple responses, providing the following hazard priority rankings (on 1-5 scale, where 5 = Most Concerned or Highest, 1= Least Concerned or Low).

Hazard	Mean Priority (1= Most, 5 = Least)	# of Times Ranked as Most Concern
Infectious Disease	4.00	3
Insect-borne Disease	4.00	3
Extreme Heat	3.56	2
Windstorm-High Winds	3.56	2
Drought	3.22	2
Flash Flooding/Erosion	3.22	1
Ice Storm	3.22	1
Highway Accident	3.11	0
Invasive Species	3.11	0
Hail Storm	3.00	0
Structure Fire	2.89	0
Inundation Flooding	2.78	1
Extreme Cold	2.56	0
Snow Storm	2.56	0
Ice Jam	2.44	0
Hazardous Materials Spill/Release	2.33	0
Tornado	2.33	0
Lightning Strike	2.22	0
Wildfire	2.11	0
Landslide	1.78	0
Dam Failure	1.44	0
Earthquake	1.22	0

Appendix 2. FEMA Flood Insurance Rate Map
(Available at https://msc.fema.gov/portal/search?AddressQuery=shoreham%20VT)

Number 5001710005B, effective August 1, 1979

Number 5001710020A, effective August 1, 1979

Number 5001710010B, effective August 1, 1979

Number 5001710015A, effective August 1, 1979

Appendix 3. Flood Hazard and River Corridor Zoning Bylaws
Flood Hazard language in 2024 Shoreham Unified Development Regulations

§2.02 INTERPRETATION OF ZONING DISTRICT BOUNDARIES *[p3]*

B. Special Flood Hazard Area—Boundary determinations:

1. FIRMs (Flood Insurance Rate Maps) for Shoreham have not been revised since 1980. They are based on a 1979 Flood Insurance Study produced by the US Department of Housing and Urban Development and the Federal Insurance Administration. The maps indicate Shoreham has the following Flood Hazard areas:

a. ***Zone A***—NE quarter of Town; primarily along the Lemon Fair south to Perry Brook; 100-year flood levels, no base elevations shown; focus of Article VII River Corridor provisions.

b. Zone A2—Lakeshore Bridport to Orwell; 100-year flood level, base elevation 103′; primary focus of Article VII SFHA regulations [§442].

c. Zone B—Cedar Swamp; shallow flooding, depths less than 1′; no base elevations shown

d. Zone C—Main portion of Town lands, anything not included in A, A2, or B; minimal flooding.

2. Where available (i.e. Zone A2) the base flood elevations and floodway limits provided by the National Flood Insurance Program in the most recent Flood Insurance Study, and accompanying maps, shall be used to administer and enforce the Article VII provisions of these Regulations.

3. In areas where base flood elevations and floodway limits have not been provided by the National Flood Insurance Program (i.e. Zone A), base flood elevation and floodway limit information available from State or Federal agencies or other sources, shall be obtained and utilized to reasonably administer and enforce these Regulations

§2.107 Special Flood Hazard Area District (SFHA) See §2.02B and Article VII

See *River Corridor Map*, p. 115, *Resources & Wildlife Habitat Areas*, p.117, *Flood Hazard Areas Map*, p.119

A. Description & Purpose. This district includes all lands in the Town of Shoreham identified as areas of Special Flood Hazard on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) as most recently revised (FIRMs are at the Town Office). More specific and detailed standards are found in Article VII. It is the purpose of this district to:

1. Prevent increases in flooding caused by uncontrolled development of lands in areas of special flood hazard;

2. Minimize losses due to floods by restricting or prohibiting uses that are dangerous to health, safety, or property in times of flood or cause measurable increases in flood heights or velocities;

3. Require that uses which are vulnerable to floods, including the public facilities that serve such uses, are protected against flood damage at the time of initial construction; and

4. Enable property owners to obtain flood insurance through the National Flood Insurance Program (NFIP).

B. Permitted Uses. Per FEMA; Agricultural, Recreational, and certain Residential Accessory Uses are permitted, with several restrictions. See §7.102(A) & (C) and §7.203(B) & (D) for details.

C. Conditional Uses. Any Permitted Use failing to meet the criteria in §7.102(A) & (C) or §7.203(B) & (D) and the Uses listed in §7.102(G)(ii) & (iii) are subject to Conditional Use Review [§5.100].

D. Dimensional Standards (unless otherwise specified). As specified in the underlying district.

E. District Standards. Mandatory State [24 VSA §4424] and Federal [44 CFR §60.3 and §60.6] requirements apply to all development within this district, including—but not limited to—structural standards, administrative requirements, and variance requirements [§7.205, §7.500, §7.508] and the Flood Hazard Definitions in Article VIII. Accordingly:

1. Applications for development within the Special Flood Hazard Areas are subject to State requirements per Act 16, and FEMA.

2. Permitted uses within the underlying district shall be subject to the Conditional Use provisions pertaining to Flood Hazard Area Review under §7.102(D) and §7.203(E).

3. Where the Flood Hazard Areas impose more restrictive standards on development than found elsewhere in these Unified Development Regulations, the Flood Hazard Area standards shall apply.

4. Requests for variances for development within the SFHA shall be subject to review under §7.506 and §3.700.

[p33] **D. Special Flood Hazard Area Criteria**—In addition to the requirements in §7.103, §7.204, and §7.308, the DRB shall only grant a Variance within the Special Flood Hazard Areas if all of the following criteria are met, in accordance with the Act and with CFR §60.6 of the National Flood Insurance Program:

1. No increase in flood levels during the base flood discharge would result.

2. The structure or other development is protected by methods that minimize flood damages.

3. The Variance, if granted, would not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, or cause fraud on or victimization of the public.

§7.200 SPECIFIC FLOOD HAZARD AREA PROTECTION *[p108]*

Purpose: To protect public health and safety by avoiding cumulative increases in flood elevations, velocities, and river instability; the cumulative loss of beneficial floodplain functions; and to minimize flood damage to development and services already located within this hazard zone.

§7.201 Lands to which these Regulations apply

A. Flood Hazard Areas (primarily Cedar Swamp area between Basin Harbor/North Cream Hill Rds and Rte 22A)

This bylaw shall apply to the Special Flood Hazard Areas (SFHA) as mapped in the Town of Shoreham, identified in and on the most current flood insurance studies and maps published by the Department of Homeland Security, FEMA, National Flood Insurance Program (NFIP), as provided by

the Secretary of the Agency of Natural Resources (ANR) pursuant to 10 VSA §753, which are hereby adopted by reference and declared to be part of this bylaw.

B. Base Flood Elevations and Floodway Limits

1. Where available, base flood elevations (BFE) and floodway limits provided by the NFIP and in the Flood Insurance Study and accompanying maps shall be used to administer and enforce this bylaw.

2. The floodway, as adopted by this community, shall consist of the channel of a river or other watercourse and the adjacent land areas that shall be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point.

3. In the SFHA where base flood elevations and/or floodway limits have not been provided by the NFIP in the Flood Insurance Study and accompanying maps, it is the applicant's responsibility to develop the necessary data.

Where available, the applicant shall use data provided by FEMA, or state or federal agencies to administer this bylaw.

4. If the Town acquires data that indicates a change in published base flood elevations, the Town will, within 6 months, submit the technical or scientific data to Vermont ANR and the NFIP Map Specialist.

§7.202 Jurisdictional Determination

A. The information presented on any maps, or contained in any studies, adopted by reference, is presumed accurate.

B. If uncertainty exists with respect to the boundaries of the Flood Hazard Area, the location of the boundary shall be determined by the ZA.

§7.203 Development Review in the Flood Hazard Areas *[p108]*

A. Permits

Except as provided in B. Exempted Development, below, a permit is required from the ZA for all development that is located within the Special Flood Hazard Area. Development that requires conditional use approval or a variance from the DRB under this bylaw must have such approvals prior to the issuance of a permit by the ZA. All permits shall require that a permittee have all other necessary permits from state and federal agencies before work may begin

E. Conditional Use, DRB Review

In accordance with 24 VSA §4414, Conditional Use Review and approval by the DRB is required prior to the issuance of a permit by the ZA for any activity in the Special Flood Hazard Area that is not exempt, prohibited, or eligible for Administrative Review.

§7.204 Development Standards within the Flood Hazard Areas

A. No net loss of flood storage capacity, except as needed to fill an existing basement or mitigate an existing structure.

B. All development below the Design Flood Elevation (DFE), except development that is exempt under

§7.203(B), shall be:

1. reasonably safe from flooding;
2. designed (or modified) and adequately anchored to prevent flotation, collapse, release, or lateral movement of the structure;
3. constructed with materials resistant to flood damage;
4. constructed by methods and practices that minimize flood damage;
5. constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
6. adequately drained to reduce exposure to flood hazards.

C. Fuel storage tanks and vents must be elevated above the Design Flood Elevation (DFE) and securely anchored;

Storage tanks may be placed underground if a qualified professional certifies the installation will be anchored and protected from flood forces.

D. In Zones AE and A1–A30 where floodway limits have not been determined, development shall not be permitted unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated encroachment, will not increase the base flood elevation more than one foot at any point within the community. The demonstration shall be supported by technical data that conforms to standard hydraulic engineering principles and certified by a registered professional engineer. Shoreham has A2, but no AE, A1, or A3-A30 areas delineated.

E. Recreational vehicles, equipment, boat trailers, portable toilets, construction trailers, and other travel trailers shall:

1. Be currently registered, licensed, and ready for highway use; or
2. Be on site for fewer than 180 consecutive days; or
3. Meet the requirements for structures in §7.205, below.

F. Water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.

G. Sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters.

H. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

I. The flood carrying capacity within any altered or relocated portion of any watercourse shall be maintained, any alteration or relocation shall not result in any decrease of stream equilibrium.

J. Bridges, culverts, and channel management activities, which by their nature shall be placed in or over the watercourse, shall have a Stream Alteration permit from the Agency of Natural Resources, if required.

K. Subdivisions and Planned Unit Developments shall be accessible by dry land access.

§7.205 Structural Standards

A. New or Substantially Improved structures shall have the lowest floor, including basement, elevated to or above the Design Flood Elevation (two feet above base flood elevation). This shall be documented in the proposed and as-built condition with a FEMA Elevation Certificate.

B. New non-residential structures, and non-residential structures to be substantially improved, replaced, or that have incurred substantial damage shall:

1. Meet the standards of §7.204, above; or
2. Have the lowest floor, including basement, together with attendant utility and sanitary facilities, designed so that to at least two feet above the base flood elevation the structure is dry floodproofed, meaning watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;
3. A permit for dry floodproofing shall not be issued until a registered professional engineer or architect has reviewed the structural design, specifications, and plans, and has certified that the design and proposed methods of construction are in accordance with accepted standards of practice for meeting the provisions of this subsection.

C. Critical facilities to be substantially improved shall have the lowest floor, including basement, elevated or dry-floodproofed at least one foot above the elevation of the 0.2% annual flood height (500-year floodplain), or three feet above base flood elevation, whichever is higher.

D. Historic structures being substantially improved shall meet the requirements in this bylaw other than the lowest floor elevation.

E. Fully enclosed areas below grade on all sides (including below grade crawlspaces and basements) are prohibited.

F. Fully enclosed areas below the lowest floor, that are above grade, below the DFE, and subject to flooding, shall:

1. be solely used for parking of vehicles, storage, or building access, and such a condition shall clearly be stated on any permits; and be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Such designs shall be certified by a registered professional engineer or architect; or

2. meet or exceed the following minimum criteria: A minimum of two openings on two walls having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above adjacent grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters; and

3. a small accessory structure of 500 square feet or less need not be elevated to the base flood elevation if adequate flood openings are provided, the structure is placed on the site so as to offer the minimum resistance to the flow of floodwaters, and the construction meets the criteria in §7.204 (B) above.

§7.300 DEVELOPMENT STANDARDS WITHIN THE FLOODWAY *[p111]*

A. Within the Floodway new encroachments are prohibited except for the following, which also shall comply with §7.300 (B), below:

1. changes to existing structures where the footprint is proposed to expand horizontally into the floodway less than 500 square feet;

2. new encroachments relating to bridges, culverts, roads, stabilization projects, public utilities, functionally dependent uses, and river or floodplain restoration projects;

3. new encroachments relating to health and safety measures, such as replacement of pre-existing on-site septic and water supply systems, if no other practicable alternative is available.

B. Within the Floodway all proposed new encroachments are required to provide a hydraulic analysis, performed by a registered professional engineer, in accordance with standard engineering practice, certifying that the proposed development will:

1. Not result in any increase in flood levels during the occurrence of the base flood;
2. Not increase base flood velocities; and
3. Not increase any risk to surrounding properties, facilities, or structures from erosion or flooding.

C. For development that will not result in any change in grade, the hydrologic & hydraulic analyses maybe waived, where the applicant will provide pre- and post-development elevations demonstrating that there will be no change in grade, and that the development will be adequately protected from scour

§7.400 OTHER PROVISIONS *[p112]*

§7.401 Precedence of these Flood Hazard Area & River Corridor Regulations

The provisions of this Article (VII) shall not in any way impair or remove the necessity of compliance with any other local, state, or federal laws or regulations. Where this bylaw imposes a greater restriction, the provisions here shall take precedence.

§7.402 Validity and Severability

If any portion of this bylaw is held unconstitutional or invalid by a competent court, the remainder of this bylaw shall not be affected.

§7.403 Warning of Disclaimer of Liability

These provisions do not imply that land outside of the areas covered by this bylaw will be free from flood or erosion damages. These provisions shall not create liability on the part of the Town of Shoreham, or any municipal official or employee thereof, for any flood or erosion damages that result from reliance on this bylaw, or any administrative decision lawfully made hereunder.

River Corridor language in 2024 Shoreham Unified Development Regulations

§7.100 SPECIFIC RIVER CORRIDOR PROTECTION

Purpose River corridors provide rivers and stream channels with the space necessary to maintain or reestablish floodplain access and to reduce erosion hazards through natural physical processes. It is the intent of this bylaw to protect public health and safety by avoiding new encroachments into river corridors and minimizing erosion-related damage to existing structures.

A permit is required from the ZA for all development that is located within the River Corridor except as provided in §7.102(A) Exemptions. Where River Corridors and Flood Hazard Areas overlap, the FHA provisions shall also apply [§7.200].

§7.101 RIver Corridor Boundaries (primarily along the Lemon Fair) Also see §2.02

This Article applies to the River Corridors in the Town of Shoreham as published by the Agency of Natural Resources (ANR) including refinements to that data which are hereby adopted by reference.

1. On streams with a watershed size greater than half a square mile for which River Corridors are not mapped, the standards apply to the area measured as 50 feet from the top of the stream bank or slope.

2. The information presented on any maps, or contained in any studies adopted by reference, is presumed accurate. If uncertainty exists with respect to the boundaries of the River Corridor, the location of the boundary on the property shall be determined by the ZA.

3. If the applicant disagrees with the determination made by the ZA or with the river corridor as mapped, the applicant has the option to:

a. hire a licensed land surveyor or registered professional engineer to stake out the River Corridor boundary as mapped on the property; or

b. provide data as needed for ANR to update the river corridor map following the Flood Hazard Area and River Corridor Protection Procedure ("Procedure"); or

c. request a letter of determination from ANR that the proposed development meets the Performance Standard in the Procedure.

§7.102 Development Review in River Corridors

A. Exempted Development in the River Corridor

The following activities do not require a permit for purposes of floodplain management, but may

require a municipal permit:

a. removal of a building or other improvement in whole or in part, so long as the ground elevations under and adjacent to the removed structure remain unchanged;

b. changes to a structure that will not change the footprint of the structure;

c. maintenance of existing sidewalks, roads, parking areas, stormwater drainage, bridges, culverts, and channel stabilization;

d. functionally dependent uses that must be placed in or cross over rivers and streams that are not located in a flood hazard area and that have coverage under a Stream Alteration Permit, if required, under 10 VSA §41 and the rules adopted thereunder including the construction, removal, or repair of bridges and culverts, associated transportation and utility networks, dams, and dry hydrants;

e. planting projects which do not include any construction or grading;

f. subdivision of land that does not involve or authorize development;

g. activities exempt from municipal regulation and requiring a permit from ANR under the Vermont Flood Hazard Area and River Corridor Rule (CVR 12-030-024) including:

i. State-owned and operated institutions and facilities;

ii. forestry operations or silvicultural (forestry) activities conducted in accordance with the Vermont Department of Forests and Parks Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont or other accepted silvicultural practices, as defined by the Commissioner of Forests, Parks and Recreation;

iii. agricultural activities conducted in accordance with the Vermont Agency of Agriculture, Food and Market's Required Agricultural Practices (RAPs). Prior to the construction of farm structures, the farmer shall notify the ZA in writing of the proposed activity. The notice shall contain a sketch of the proposed structure including setbacks;

iv. public utilities regulated under 30 VSA §248;

v. telecommunications facilities regulated under 30 VSA §248a;

B. Prohibited Development in the River Corridor

1. New structures, fill, and development that do not meet the standards in §7.103 Development Standards;

2. Any other development that is not exempt, permitted, or listed as a conditional use which would cause or contribute to fluvial erosion hazards.

C. Administrative Review

The following development activities meeting the §7.103 Development Standards in the River Corridor may be permitted directly by the ZA:

1. small accessory structures not larger than 500 square feet;

2. improvements to utilities along an existing right-of-way and serving a building;
3. replacement on-site septic systems;
4. access and parking;
5. a deck or patio that is 200 square feet or less, is attached to an existing structure, and is located no less than 100 feet from the top of bank;
6. unimproved trails on native grades and soils that will be relocated as needed to accommodate channel adjustments and avoid degradation to bank stability and riparian habitat;
7. river or floodplain restoration projects that do not involve fill, structures, utilities, or other improvements, and which have written confirmation from the ANR Regional Floodplain Manager that the project is designed to meet or exceed the applicable standards in this bylaw.

D. Conditional Use Review

Conditional Use Review and approval by the DRB in accordance with 24 VSA 4461 is required prior to the issuance of a permit by the ZA for any activity in the River Corridor that is not exempt, prohibited, or eligible for Administrative Review.

§7.103 Development Standards within the River Corridor

These are the minimum standards for development in the River Corridor. Where more than one district is

involved, the most restrictive standard shall take precedence.

A. In-Fill: Development must be located no closer to the top of bank than the existing primary structures, within a gap that is no more than 300 feet (see Figure 1), or

B. Down River Shadow: An addition to an existing habitable structure, or an accessory structure that is adjacent to an existing structure, shall be located in the shadow area directly behind and further from the channel than the existing structure, or within 50 feet to the downstream side and no closer to the top of bank.

Below-ground utilities may also be placed within the same shadow dimensions of an existing below-ground system (see Figure 2).

Only primary structures existing before this bylaw may be considered for shadowing other development.

C. River Corridor Performance Standard

Proposals that do not meet the infill or shadowing criteria in §A or §B must demonstrate, and the DRB must find, that the proposed development will:

1. not be placed on land with a history of fluvial erosion damage or threatened by fluvial erosion; and

2. not cause the river reach to depart from or further depart from the channel width, depth, meander pattern, and slope associated with natural stream processes and equilibrium conditions; and
3. not result in a need for bank armoring or stream channelization as a result of the proposed development, that would increase flood elevations and velocities, or alter the sediment regime triggering channel adjustments and erosion in adjacent and downstream locations.

D. The DRB may request or consider additional information to determine if the proposal meets the River Corridor Performance Standard in C above, including data and analysis from a consultant qualified in the evaluation of river dynamics and erosion hazards; and comments provided by the DEC Regional Floodplain Manager on whether the proposal meets the River Corridor Performance Standard.

E. New paths or alterations to paths that provide access to the water for the public, and promote the public trust uses of the water, shall not necessitate bank armoring, and must be relocated when the channel adjusts toward the path.

Figure 1: In-fill Development Standard

Figure 2: Shadow Development Standard

Appendix 4. Wind Scales

Saffir-Simpson Hurricane Wind Scale				
Tropical Depression		≤38 mph, ≤33 knots, ≤62 km/h	**Tropical Storm**	39–73 mph, 34–63 knots, 63–118 km/h
Category	**Wind Speed**	**Types of Damages Due to Hurricane Winds**		
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.		
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.		
3 (Major)	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-built frame homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.		
4 (Major)	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.		
5 (Major)	≥ 157 mph ≥ 137 kt ≥ 252 km/h	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.		

Source: https://www.nhc.noaa.gov/aboutsshws.php

Enhanced Fujita Scale			
Scale	**Wind Speed**		**Types of Damages Due to Hurricane Winds**
	mph	km/h	
EF0	65-85	105-137	*Minor or no damage.* Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	138-177	*Moderate damage.* Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	178-217	*Considerable damage.* Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	218-266	*Severe damage.* Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
EF4	166-200	267-322	*Devastating damage.* Well-constructed and whole frame houses completely leveled; cars and other large objects thrown and small missiles generated.
EF5	>200	>322	*Extreme damage.* Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile (1.6 km).

Source: http://www.spc.noaa.gov/efscale/ef-scale.html

Appendix 5. Winter Storm Severity Index

The WSSI is broken down into six components that are individually weighted based on the WSSI categories and then summarized into overall severity:

- **Snow Amount:** to depict severity due to total amount of snow or rate of snowfall accumulation. (Adjustments are made based on climatology and urban areas, e.g. 4" of snow in Atlanta is more severe than 4" in Minneapolis.)
- **Snow Load:** to depict severity due to total weight of snow on trees and power lines.
- **Blowing Snow:** to depict severity mainly to transportation due to blowing and drifting snow.
- **Ice Accumulation:** to depict severity of transportation and downed trees/powerlines due to the accumulated ice in combination with wind.
- **Ground Blizzard:** to depict severity to mainly transportation of ground blizzards that develop due to a pre-existing snowpack and strong winds.
- **Flash Freeze:** to depict severity primarily to transportation of situations where temperatures rapidly fall below freezing during precipitation.

Scale for the Winter Storm Severity Index (WSSI)	
Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
	Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.
	Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

Source: https://www.weather.gov/ict/WSSI_Overview

Appendix 6. Air Quality Index categories and guidance

When the AQI is:	Who needs to be concerned?	What should I do?
Good (0 to 50)	No one	It's a great day to be outside!
Moderate (51 to 100)	Some people who may be unusually sensitive to air pollution (for example, if you have symptoms like coughing or if you are short of breath)	**People experiencing symptoms:** Consider making outdoor activities shorter and less intense (for example, 30 minutes instead of 1 hour, or walking instead of running). Watch for symptoms like coughing or shortness of breath. These are signs to take it easier. **Everyone else:** It's a good day to be outside.
Unhealthy for some groups (101 to 150)	People highly affected by air pollution: • People with heart or lung disease • Older adults • Children	**People highly affected by air pollution and anyone experiencing symptoms:** Make outdoor activities shorter and less intense (for example, 30 minutes instead of 1 hour, or walking instead of running). Take more breaks. Watch for symptoms like coughing or shortness of breath. These are signs to take it easier. When outdoors, consider wearing a well-fitting N95/KN95 mask.** Additionally, **if you have asthma,** follow your asthma action plan and keep quick relief medicine handy. **If you have other lung diseases or heart disease**, symptoms such as palpitations, shortness of breath or unusual fatigue may indicate a serious problem. Contact your health care provider if you are having any of these symptoms.
Unhealthy (151 to 200)	Everyone	**People highly affected by air pollution:** Make outdoor activities shorter and less intense (for example, 30 minutes instead of 1 hour, or walking instead of running). Consider rescheduling or moving outdoor activities indoors.* When outdoors, consider wearing a well-fitting N95/KN95 mask.** **Everyone else:** Make outdoor activities shorter and less intense (for example, 30 minutes instead of 1 hour, or walking instead of running). Take more breaks during outdoor activities.
Very unhealthy (201 to 300)	Everyone	**People highly affected by air pollution:** Avoid all physical activity outdoors. Reschedule to a time when air quality is better or move activities indoors.* When outdoors, consider wearing a well-fitting N95/KN95 mask.** **Everyone else:** Make outdoor activities shorter and less intense (for example, 30 minutes instead of 1 hour, or walking instead of running). Take more breaks during outdoor activities. Consider rescheduling or moving outdoor activities indoors.