Town of South Hero
2026 Local Hazard Mitigation Plan

Adopted by the Town of South Hero, Selectboard 10/12/2026

FEMA Approved Pending Adoption:_____

FEMA Final Approval:_____

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Executive Summary

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from natural hazards and their effects. The Town of South Hero Hazard Mitigation Plan is a comprehensive strategy designed to reduce the risks posed by natural hazards and enhance the resilience of the community. Developed through a planning process involving a committee of key staff and stakeholders, the plan identifies natural hazards, assesses vulnerabilities, and outlines mitigation strategies to protect lives, property, and the environment in the town.

The legislative authority that provides the legal basis for mitigation is derived from the Stafford Act, as amended by the Disaster Mitigation Act of 2000. Section 322 of the Stafford Act specifically addresses mitigation planning. This establishes the requirement that state and local governments prepare hazard mitigation plans as a precondition for receiving FEMA mitigation project grants. More importantly, this plan and planning process lays out the strategy that will enable the town to become less vulnerable to future disaster losses. The process followed a methodology prescribed by FEMA.

The hazard identification and risk assessment process identified and examined a range of hazards with the potential to impact the community. It focuses on the specific hazards that were considered the greatest threat to the community including strong winds, lakeshore flooding and flood inundation, lakeshore erosion and fluvial erosion and winter storms (ice storms). It included the history of losses and analyzed future risks posed to the town. Analysis of historical data, modeling, and stakeholder input informed the identification of high-risk areas, critical infrastructure and vulnerable populations.

The plan identifies several mitigation strategies and actions that are based on the results of the risk assessment. They are aimed at reducing risk, enhancing preparedness, and promoting resilience across The Town of South Hero. The actions are summarized into four types: local planning and regulations, structural and infrastructure projects, natural system protections and education and awareness programs. The plan also includes a review of the town's current capabilities to reduce hazard impacts.

This plan (has been /will be) formally adopted by the Town of South Hero Selectboard. It is required to be updated at a minimum of every five years. Monitoring and evaluation mechanisms were established to track progress, assess effectiveness, and adapt strategies as needed to address changing conditions and emerging threats. By working together and implementing targeted mitigation measures, we can protect lives, property and the environment, and ensure a safer and more sustainable future for all residents of the community.

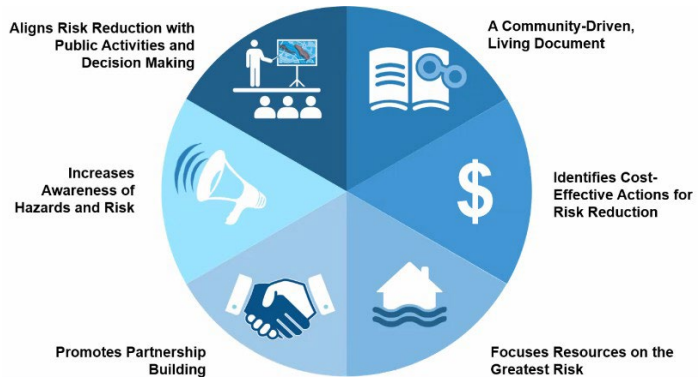
1. INTRODUCTION

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this plan is to provide an all-hazards local mitigation strategy that makes the Town of South Hero more disaster resistant.

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects. Based on the results of previous efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe and identify local actions that can be taken to reduce the severity of the hazard.

Hazard Mitigations strategies and measures **alter** the hazard by eliminating or reducing the frequency of occurrence, **avert** the hazard by redirecting the impact by means of a structure or land treatment, **adapt** to the hazard by modifying structures or standards or **avoid** the hazard by stopping or limiting development and could include (but not limited to) projects such as:

- Flood-proofing structures
- Tying down propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters
- Elevating structures or utilities above flood levels
- Identifying & upgrading undersized culverts
- Proactive land use planning for floodplains and other flood-prone areas
- Proper road maintenance and construction
- Ensuring critical facilities are safely located
- Buyout & relocation of structures in harm's way
- Establish & enforce appropriate building codes
- Public information and education.



Source: FEMA LHMP Skill Share Workshop

2. PURPOSE

The purpose of this Hazard Mitigation Plan is to assist the Town of South Hero in identifying all hazards facing the county and their community and identify strategies to begin reducing risks from identified hazards. Once adopted, the local mitigation plan is not legally binding; instead, it outlines goals and actions to prevent future loss of life and property.

South Hero strives to be in accordance with the strategies, goals and objectives of the state of Vermont's Hazard Mitigation Plan.

Adopting and maintaining the Local Hazard Mitigation Plan will provide the following benefits:

3. PLANNING PROCESS

The Town of South Hero, Vermont Local Hazard Mitigation Plan 2025 is an update to the single jurisdictional Town of South Local Hazard Mitigation Plan 2018. The Town of South Hero and Northwest Regional Planning Commission conducted a thorough review of the 2018 Local Hazard Mitigation Plan at the beginning of the process and used it as a foundation to develop the 2025 Local Hazard Mitigation Plan.

At the July 8, 2024 meeting of the South Hero Town Selectboard, they agreed to revisit and update the draft Mitigation Plan with assistance from Northwest Regional Planning Commission. Public comment was taken at the meeting regarding the update.

Incorporation of Existing Plans, Studies, Reports and Technical Information

The Town of South Hero, VT Local Hazard Mitigation Plan 2025 development utilized plans, policies, studies, historical records, data and technical information as a foundation. Such information provided a comprehensive understanding of existing hazards, vulnerabilities and community needs. The information ensured the plan is effective and tailored to the specific context of the community.
A complete list may be found in Table 1.

Table 1: Reference Materials

Information Source	Review and Incorporation
American Community Survey Five Year Estimate 2023	Used to develop community profile section.
FEMA Disaster Declaration Website	Data from the site was used during the hazard profile and risk assessment sections.
FEMA Hazard Mitigation Assistance Program Policy Guide 2024	Used to ensure plan meets the Federal mitigation planning requirements including those address climate change.
FEMA Local Mitigation Planning Handbook 2023	The handbook was used to ensure plan meets the Federal mitigation planning requirements including those for addressing climate change. Referenced throughout the planning process.
FEMA NFIP Insurance Reports 2024	Used to determine how many structures are insured, number of repetitive loss properties and describe NFIP compliance.
FEMA Risk Mapping, Assessment and Planning (Risk Map) Products	The data was referenced during the hazard profile and capabilities section of this plan.
National Oceanic and Atmospheric (NOAA) Climatic Data Center's Storm Events Database	Data was referenced and incorporated in the hazard identification and risk assessment section of this plan.
Northwest Regional Planning Commission Regional Plan 2023	The physical region section was referenced during the risk assessment as well as various data references on population and transportation.
Northwest Regional Planning Local Liaison Reports of Storm Damage	Referenced to develop the risk assessment section.

Town of South Hero Development Regulations 2021	The sections reviewed included zoning, subdivision regulations, and regulations for special flood hazard areas and regulations for river corridor areas.
Town of South Hero Local Emergency Management Plan 2025	The plan was reviewed and referenced throughout the planning process.
Town of South Hero Road Erosion Inventory (Municipal Roads General Permit)	Referenced to develop the risk assessment section and mitigation actions section.
Town of South Hero, Town Plan 2023-2031	Existing land use, population, transportation and future land use, public facilities, public services, flood resilience. The plan was referenced throughout the process.
Town of South Hero, VT Flood Insurance Study 1980	The date was referenced for risk assessment section and used in capabilities section.
Town of South Hero, VT Flood Insurance Rate Maps 2001	The date was referenced for risk assessment section and used in capabilities section.
VELCO Outage Reports	Reference during Risk Assessment section of plan.
Vermont Agency of Transportation Bridges and Culverts On-Line Database	The data was referenced during the risk assessment and mitigation actions review.
Vermont Agency of Transportation Resilience Planning Tool	Referenced to develop the risk profile and mitigation actions.
Vermont ANR's Natural Resource Atlas	Tool was referenced throughout the process.
Vermont Bridge and Roads Standards – 2024	The document was referenced during the capabilities and mitigation projects meetings.
Vermont Climate Office Municipal Climate Change Vulnerability Index Tool	Tool used to understand municipal vulnerabilities to climate change across several social, economic, and environmental factors.
Vermont Dam Inventory	The tool was referenced during the risk assessment section and mitigation actions to address floods.
Vermont Department of Health website	Referenced during research of hazard identification and risk assessment section of plan.
Vermont Flood Ready Website	Data from the website was referenced throughout the planning process and used in various sections of the plan.
Vermont Functional Floodplain Initiative Web Tool	Referenced during research of hazard identification and risk assessment section of plan.
Vermont Hazard Mitigation Plan 2023	The entire plan was reviewed and referenced during the development of this plan.

Documentation of the Planning Process, Public Input and Input from Neighboring Communities

The Town of South Hero assembled a Hazard Mitigation Planning Team to participate in creating a Hazard Mitigation Plan. The Northwest Regional Planning Commission (NRPC) assisted the Town with the creation of the plan. The Town actively invited various stakeholders in the planning process including residents, local businesses, local neighboring government

agencies, regional emergency management committee, schools, and non-profits that work directly with or provide support to people with disabilities and functional access needs.

Planning Team Member: A planning team member is a designated individual who actively participates in the planning process. They may be responsible for specific tasks such as data analysis, strategy development, and drafting the plan. Planning team members are usually part of the formal planning structure and may have specific roles based on their expertise or position within an organization.

Stakeholder: While stakeholders are also involved in the process, they may not have a formal role or responsibility within the planning team. Their participation is often more about providing input, feedback, and support rather than executing the planning tasks. Stakeholders can influence the planning process through their contributions but are not necessarily tasked with specific planning duties. Table 2 lists the planning team.

Table 2: Hazard Mitigation Planning Team

Name	Organization	Role
Sue Arguin	Town Administrator	Planning Team Lead
Dave Carter	South Hero Selectboard Chair/EMD	Planning Team Member
Naomi King	Communications / Town Clerk	Planning Team Member
Kim Julow	South Hero Treasurer	Planning Team Member
Martha Taylor-Varney	Zoning Administrator	Planning Team Member
Patrick Robinson	Chief - South Hero Fire Department	Planning Team Member
Dave Lane	South Hero Selectboard Vice Chair	Planning Team Member
Shaun Coleman	Northwest Regional Planning Commission	Planning Team Member
John Beaulac	South Hero Road Foreman	Planning Team Member
Ann Zolotas	South Hero Selectboard	Planning Team Member
Troy Toth	South Hero Rescue	Stakeholder (First Response)
William Johnson	Vermont Electric Co-op	Stakeholder (Electric Utility)
John Bartlet / Amber Baker	Acting Milton Town Co-Managers	Stakeholder (neighboring community)
Ray Allen	Grand Isle Co. Sheriff's Office	Stakeholder (Law Enforcement)
Bill Baron	Grand Isle EMD	Stakeholder (neighboring community)
Adam White	Grand Isle Fire Chief	Stakeholder (neighboring community)
Jacqueline Kelley	EP, Vermont Department of Health, St. Albans District	Stakeholder (Public Health)

Mike Murdock	Chair, Grand Isle County Regional Emergency Management Committee President, Grand Isle County Mutual Aid Association, Inc.	Stakeholder (First Response/Mutual Aid)
Jordan Posner	Champlain Islanders Developing Essential Resources (C.I.D.E.R.)	Stakeholder (Range of Community Services including older adults and people with disabilities and functional access needs)
Jess Graff	Director, Champlain Valley Office of Economic Opportunity (CVOEO)	Stakeholder (People with Disabilities and Functional Access Needs)
Whitney Doremus	Grand Isle Food Shelf	Stakeholder (Food, Water, Shelter)
Ashley Bartley	Visiting Nurses Association	Stakeholder (Senior Healthcare, Hospice and Community Support Services)
Jan Carney	University Of Vermont Medical Center	Stakeholder (Hospital)
Lisa Tourville	Champlain Islands Community Health Center	Stakeholder (non-profit healthcare center)
Julie Pidgeon, Principal Rich Monterosso Chair School Board	Folsom Education and Community Center	Stakeholder (Education)
Terry Robinson	South Hero Historical Society	Stakeholder (Historical)

Stakeholder Engagement and Public Outreach

The mitigation committee and NRPC developed a stakeholder and public outreach plan to ensure they were given opportunities to be involved in the plan's development process. Engagement and outreach are crucial for hazard mitigation planning for several reasons including fostering inclusive decision-making, strengthening community resilience through active participation, raising risk awareness and preparedness through education, transparency, and promoting consensus building. The plan may be found in Appendix G.

Plan Development Process

The Town of South Hero held several planning meetings to discuss the development of the Hazard Mitigation Plan update. All meetings were open to the public. Public in attendance at the meetings were encouraged to participate. All meeting agendas were posted at 3 locations in the municipality in compliance with the requirements of Vermont Open Meeting Law. All meetings were chaired by the Town Administrator, Sue Arguin. Hard copies of drafts discussed at meetings were available to the public in attendance at meetings and upon request.

September 26, 2024: The Town of South Hero's initial meeting with Town Administrator and NRPC staff member to discuss the mitigation planning process, assembly of planning team, stakeholder engagement and public outreach plan. This included a review of the Town's new Communication Plan & Policy.

October 24, 2024: Survey and flyer were agreed to by the committee and finalized and released to the public. This was to solicit input from the whole community. The town proved notice of the survey by posting at several locations throughout the community including the library, Town Office, Post Office, school, and Champlain Islands Health Center. The flyer with QR code was also posted on Town's official webpage, Facebook page and NRPC's Town of South Hero Mitigation Plan project web page.

January 6, 2025 – The Northern Vermont Economic Development District held a meeting on Lamoille River Basin Flood Recovery and Resiliency Plan and Lamoille River hydrologic model for communities along Lamoille River watershed and upper Lake Champlain basin. Grand Isle County was included in the scope of this project. The meeting reviewed the framework for the hydrologic model being conducted by SLR consulting, the plan's outline for communities within the study area, discussion of continuity of operations for businesses, economic resilience strategies and a review of public engagement. This project deliverables would enhance the hazard mitigation plan.

January 9, 2025: Kickoff meeting at the Town Office with a virtual option to participate. The public meeting was warned following Vermont's Open Meeting Law requirements. Communication methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. NRPC staff facilitated the hybrid meeting. The meeting focused on past efforts, the FEMA mitigation planning process, plan update considerations, FEMA guidance, a review of the State Hazard Mitigation Plan, roles and timeline. The group also agreed to continue to utilize the NRPC website as the host for the project website for ease of administration.

January 27, 2025: NRPC staff compiled and distributed meeting notes from the previous meeting.

February 27, 2025: The committee held the hazard identification and risk assessment meeting with a virtual option at the South Hero Town Office. The public meeting was warned following Vermont's Open Meeting Law requirements. Communication methods followed the public stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. NRPC staff reviewed the mitigation planning process, community outreach efforts, timeline, review of local hazards, state hazards identified in the state Hazard Mitigation Plan, review of hazard data, update of the risk assessment section based on participant feedback. The survey was reviewed to view any input from the public.

March 4, 2025: NRPC staff compiled and distributed meeting notes from the previous meeting.

April 3, 2025: The Policies, Plans and Capabilities Meeting at the Town Office was held with virtual option to participate. The public meeting was warned following Vermont's Open Meeting Law requirements. Communications methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. The participants reviewed existing village resource capacity and capabilities, flood plain regulations, ordinances, stormwater infrastructure and inventories, local emergency management plan, and budget. The committee reviewed survey responses to date.

April 8, 2025: NRPC staff compiled and distributed meeting notes from the previous meeting and reviewed town plans, policies, ordinance and budget as provided by Town Administrator and Town Treasurer.

May 22, 2025: The Mitigation Actions, Strategies and Priorities meeting was held at the Town Office with virtual option to participate. The public meeting warned following Vermont's Open Meeting Law requirements. Communication methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. The meeting was centered on hazard mitigation strategies, confirmed mitigation goals and discussed past and future mitigation projects for the Town. There was also a review of the survey results to date and discussion of the survey.

May 27, 2025: NRPC staff compiled and distributed meeting notes from the previous meeting.

June 26, 2025 - The Northern Vermont Economic Development District held a meeting on the Flood Recovery and Resiliency Plan. The meeting included updates on the hydrologic model, and outreach efforts to businesses that was being conducted by a consultant on behalf of the economic development business offices. Areas of concern that were previously identified during the mitigation committee meetings presented for incorporation into the model.

September 11, 2025 – The draft alternatives of the hydrologic model for the Resiliency Plan were presented by SLR consulting at the Transportation Advisory Committee meeting for NW Vermont. The committee discussed how the model could be used to support economic development in the communities and to help guide future development away from areas impacted by various flood scenarios beyond the SFHAs.

February – May 2026: Additional inputs for the Recovery and Resiliency Plan and model were identified. Upon review, the updates excluded the upper Lake Champlain Basin. NRPC applied for EDA funding to continue flood modeling that would expand the flood model. The plan was on hold pending the award which was ultimately denied.

June 1, 2026: Draft plan developed and request for review by planning team and Grand Isle County Mutual Aid Meeting where the plan was presented by NRPC staff.

September 24, 2026: Public comment period opens. Plan made available on town website, NRPC website and social media. Hardcopies of the plan made available at town office and NRPC office. An email was sent to the Planning Commission Chairs of Grand Isle and Milton, Vermont, with a draft version of the plan as an attachment, soliciting comment on the draft via email. No comments from surrounding towns were received. Postings included instructions to email comments to Shaun Coleman, Senior Planner at Northwest Regional Planning Commission. NRPC Senior Planner also directly emailed final drafts to neighboring towns and stakeholders to seek input.

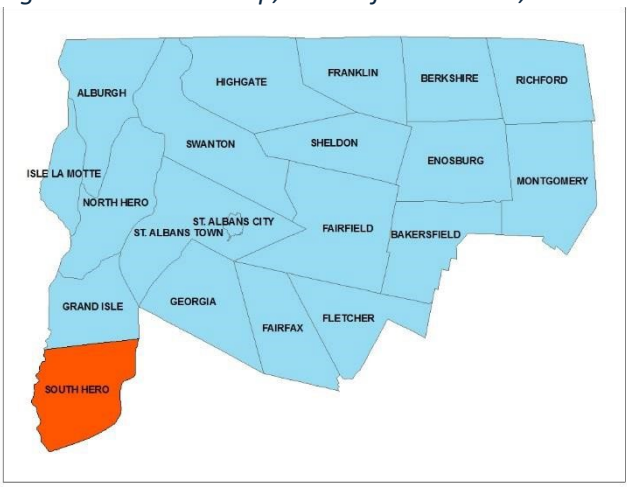
October 12, 2026: The public comment period closed. In accordance with 24 VSA §872, South Hero Selectboard adopted the 2026 Town of South Hero Hazard Mitigation at their regularly scheduled Selectboard Meeting which follows Vermont's Open Meeting Law. The Town Administrator requested the draft plan and FEMA's Local Mitigation Plan Review tool be filled out and submitted to VEM and FEMA for review and approval pending adoption.

October 13, 2026: The final draft LHMP and FEMA's Local Mitigation Plan Review Tool was submitted to VEM and FEMA for approval pending adoption.

4. COMMUNITY PROFILE

The Town of South Hero is in the southernmost part of Grand Isle County (44° 38' W, 73° 18'N). South Hero is one of the Lake Champlain islands with Grand Isle to the north and the lake surrounding all other sides. The total area of the town is approximately 9,154 acres or 14.3 square miles. The population of the community is estimated to be 1,615 according to the 2023 American Community Survey.

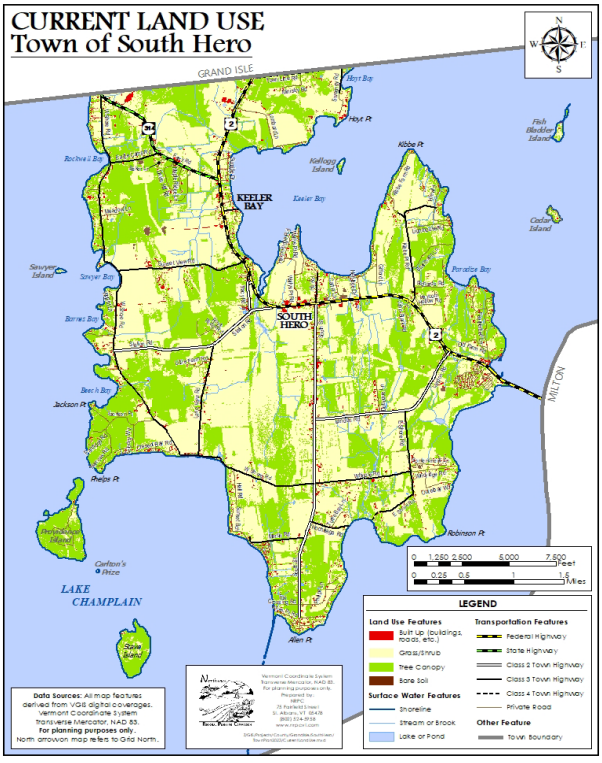
Figure.1: Location Map, Town of South Hero, VT.



As an island in Lake Champlain, South Hero is a special place. There are many features of the island that are unique and are essential to the Town's character. Among them are broad scenic views of farm fields, the lake, the Adirondack Mountains to the west and the Green Mountains to the east, broad wetlands, natural areas and fossil sites, wildlife habitat, the lake shoreline and the outer islands. Driven by a beautiful lakeshore, a thriving tourist business economy grew over a century ago, resulting in a strong seasonal increase in population and many summer homes and camps dotted along the lake. More recently, South Hero has become a bedroom community for workers employed in nearby Chittenden County and across the lake in New York. A significant number of the old seasonal camps and cottages have already been converted to year-round dwellings.

Land use in South Hero consists of two village areas along Route 2 and rural areas with dispersed residences, working farms, home based agricultural businesses, wetlands and open land. These uses are bounded by Lake Champlain with its small beaches, marshes, rocky shoreline, lakeshore residences and seasonal homes.

Figure 2: Existing Land Use/Land Cover



Current Land Use: The Town's history is rooted in agriculture, and over a quarter of the town's acreage is used for this purpose. The South Hero Land Trust works to protect forest & farmland in South Hero. Over 19% of land in South Hero is protected through one of the land trusts in the State. The amount of farmland in the Town has remained relatively consistent since 2013.

South Hero has a significant seasonal tourism industry with a large number of summer homes and camps located along Lake Champlain, in addition to a few marinas, public boat launches and a town beach. Roughly 13% of all land is used for seasonal dwellings, with 91% of those parcels being located on the lakefront. The number of seasonal residences listed with the Town has remained relatively consistent from 2013 to 2020.

South Hero's two village areas, South Hero Village and Keeler Bay Village, are located at two junctions along Route 2. The

villages consist of a mix of residential, commercial and public land uses at a higher density than the rest of Town.

Outside of the village areas, residential development is located on larger rural lots integrated with agriculture, open land and wetland areas. Nearly half of all land in South Hero is in residential use, with an average parcel size of 5.5 acres. However, this number may be skewed by a few very large lots; of the 75% of residential properties on less than 6 acres, the average acreage is 1.7 acres. 33% of all residences are located on the lakefront.

Farms: Over 4,345 acres, or nearly one half of the land in South Hero is farmed. However, farmers only own about 58% of this land. Three farmers use close to 1,720 acres or nearly 40% of all the farmland. Six farmers lease at least some land, estimated to total 1,612 acres.

South Hero has a significant seasonal tourism industry with many summer homes and camps located along Lake Champlain, in addition to a few marinas, public boat launches and a town beach. Roughly 13% of all land is used for seasonal dwellings, with 91% of those parcels being located on the lakefront. The number of seasonal residences listed with the Town has remained relatively consistent from 2013 to 2020.

South Hero's two village areas, South Hero Village and Keeler Bay Village, are located at two junctions along Route 2. The villages consist of a mix of residential, commercial and public land uses at a higher density than the rest of Town.

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South Hero has scattered areas of forested land, including mature forests, wetland forests, and young forests that are growing up from old farm fields or pastures. The large tracts of forest land include open non-forested areas and young forests that were once hay fields or pasture.

Population

As of 2020, South Hero has 1,674 year-round residents. South Hero's population grew rapidly from 1960 – 2000 and has stayed relatively stable over the last 20 years.

There is no specific data on percentage of seasonal residents, but it understood that they are a significant group in South Hero.

South Hero's population continues to age with a 12% increase on the population over age 65 in the last 12 years. Despite this, South Hero continues to attract younger families, and the population under 18 has stayed relatively stable over the past 10 years.

While population growth has slowed in the last 20 years, the number of households has continued to grow. This is likely due to a reduction in average household size in the region over the same period. Growth in the number of households will mean that the same population requires additional housing units over time

Energy

Vermont Electric Cooperative, Inc. provides the electrical service to the Town and to one of the out islands - Providence Island. Other out islands use generators or do without electricity. Historically, windmills have provided electricity at summer camps and at farms.

An estimate of current residential thermal energy demand in South Hero, based on data from the American Community Survey (ACS 2016-2021). The data shows that 43% of households in South Hero depend on fuel oil as their primary source for home heating. This is followed by propane (29.1%) and wood (16.8%). Wood includes both cord wood and wood pellets. The nearest natural gas pipeline is located in Milton and is not likely to be extended to South Hero in the future.

Emergency Services

The town has no local police department. Grand Isle County Sheriffs' Department and Vermont State Police and cover all areas of law enforcement from traffic violations to major crimes. The town currently contracts with the County Sheriff for additional coverage and help with enforcement of local traffic ordinances. This coverage includes patrolling the Town Beach during the summer months and various other extra coverage.

South Hero Rescue Squad staffed is staffed by a combination of trained volunteers and paid staff. Paid staff were funded by the Town voters starting in 2019 to alleviate staffing shortages. With the construction of the new senior housing facility the Rescue Squad anticipates an increase in calls and is considering hiring staff for nighttime shifts.

The Town Fire Department is staffed by trained volunteers. The main funding of the operations of both these organizations is through public contributions. South Hero Fire Department also has a response boat for emergency calls on the Lake. The US Coast Guard out of Burlington also offers some assistance during lake emergencies. Some purchases of equipment for the Fire and Rescue Departments are funded by tax dollars. In 2018, both organizations moved into a shared public safety building on Community Lane.

The South Hero Fire Department and Rescue Squad are active members of Grand Isle County Mutual Aid, Inc. (GICMAA). All first response departments within the County are members of GICMAA. Members of GICMAA provides assistance to one another during emergencies when needed. The reimbursement rates for assistance follow the FEMA rates.

The Community Health Center: Champlain Islands is in South Hero Village at 52 Community Lane. The services offered include primary care, medical, mental health and psychiatry. The Center is a Federally qualified Heath Center with a mission to serve all, including those typically underserved. The Center is planning to add a Dentist office in 2024. The nearest hospitals to South Hero are Northwestern Medical Center in St. Albans and the University of Vermont Medical Center in Burlington.

South Hero adopted a Local Emergency Management Plan (LEMP) in 2025 to initiate response to serious crises. The LEMP is reviewed and updated as needed on an annual basis. The Town Selectboard has executed a National Incident Management System (NIMS) resolution and continually strives to remain current on NIMS compliance through training and reporting to Vermont Department of Public Safety.

Water& Wastewater

There is no Town water & wastewater system. Fire District 4 is the current private water system which has a pumping and chlorination system to supply water to some of the residents of South Hero and Keeler Bay Villages. The District maintains its own budget and funds its operations with assessments separate from Town property taxes. All residences and

businesses must comply with State regulations when installing septic systems. Being a Lake community, the Town of South Hero encourages upgrading old wastewater systems before there is a failure issue. New technologies are available that can even pre-treat wastewater.

Transportation

South Hero roads include a Federal Highway, U.S. Route 2 (which goes to Grand Isle which connects to Canada and has a ferry connecting to New York State), a State highway, Route 314 and 22.9 miles of town roads, of which approximately half are paved. While the roads are shared by all users there are few sidewalks and no bike/pedestrian lanes. South Hero maintains these roads with the use of town owned equipment and a full-time road foreman and a few part time employees. The Select Board appoints a Road Commissioner who directs the work to be done by the road crew. The budget is set by the Select Board and supported by taxes and approximately $50,000 in state aid. There are a large number of privately owned and maintained roads in the Town. The Town provides services on town highways only.

There is one park-and-ride lot in Town. There are no regional public transit routes that directly serve South Hero. Champlain Islanders Developing Essential Resources (CIDER) is a local organization dedicated to providing transportation services to seniors and people with disabilities in order to help them remain independent.

5. RISK ASSESSMENT

Identifying Hazards, Profiling Hazards, Estimating Losses and Assessing Vulnerability

The risk assessment process involves identifying potential hazards, analyzing their impacts and assessing the vulnerabilities and evaluating the potential impacts of those hazards on the community. This includes evaluating historical disaster data, mapping hazard prone areas and estimating potential damages to people, property, infrastructure and the economy. Changes in the community profile, potential impacts of climate change, historical data and social and economic challenges, the hazard ranking varies from the 2018 Hazard Mitigation Plan.

The Planning Team discussed how climate change, land use, and demographics may increase the town's vulnerability to certain hazards. Climate change is expected to worsen these vulnerabilities by intensifying the frequency and severity of weather events and altering weather patterns. Demographic shifts, such as an aging population, higher population density, socioeconomic disparities, cultural and linguistic diversity, urbanization, transient and migrant populations, and a growing number of individuals with disabilities or functional access needs, further amplify risks. The team reached its decisions through broad consensus.

Table 3: Hazard Assessment Ranking Criteria

Score	**Frequency of Occurrence:** Probability of a plausibly significant event impacting the community or regional scale based on previous occurrences and climate change projections.	**Potential Impact:** Severity and extent of damage and disruption to built and natural environments, people, and the economy
1	Unlikely:<1% probability of occurrence per year	Negligible: isolated occurrences of minor built or natural environmental damage, potential for minor injuries, health, or well-being impacts, or minimal economic disruption.
2	Occasionally: 1–10% probability of occurrence per year, or at least one chance in next 100 years	Minor: isolated occurrences of moderate to severe built or natural environmental damage, potential for

		injuries or health or well-being impacts, minor economic disruption.
3	Likely: >10% but <75% probability per year, at least 1 chance in next 10 years	Moderate: severe built or natural environmental damage on a community scale, injuries, fatalities or impacts to individual and community well-being, short-term economic impact.
4	Highly Likely: >75% probability in a year	Major: severe built or natural environmental damage on a community or regional scale, multiple injuries or fatalities or severe long-term impacts to individual and community well-being, significant long-term economic impact.

The Hazard Assessment for the Town derives a relative risk *Score* which is the average of the sum of *Potential Impacts* multiplied by the *Probability* for each hazard. See Table 4. The relative risk score is categorized as:

- No Risk: 0
- Low Risk: 1 – 5
- Moderate Risk: 6 – 11
- High Risk: 12 – 16

All hazards identified in the state hazard mitigation plan were considered for incorporation into the South Hero Hazard Mitigation Plan. The hazards with the highest risk scores are winter storm (ice storm), invasive species, lake shore flooding and flood inundation and Lake Shore Erosion and Fluvial Erosion.

Table 4*: Hazard Assessment*

		Potential Impact				Average	Total Score*:
Hazard	**Probability**	**Infrastructure**	**Life**	**Economy**	**Environment**		
Lake Shore Flooding and Inundation Flooding	4	3	1	2	1	1.75	7
Winter Storm (Ice Storm)	4	2	2	2	1	1.75	7
Lake Shore Erosion and Fluvial Erosion	3	2	1	2	2	1.75	5.25
Strong Winds (windstorm, tornado, tropical storm, thunderstorm, hurricane)	4	2	1	1	1	1.25	5
Invasive Species	4	1	2	1	1	1.25	5
Hazardous Materials	3	2	1	1	1	1.25	3.75
Cold	3	1	1	1	1	1	3
Extreme Heat	2	1	1	1	2	1.25	2.5

Infectious Disease Outbreak	1	1	3	4	1	2.2	2.25
Drought	1	1	1	2	1	1.25	1.25
Hail	1	1	1	1	1	1	1
Earthquake	1	1	1	1	1	1	1
Major Fire – Wildland	1	1	1	1	1	1	1
Landslide	1	1	1	1	1	1	1
Dam Failure	0	1	1	1	1	1	0

Table 5: Hazard Risk Summary

Hazard Type	Probability	Impact / Magnitude	Risk	Vulnerability
Lake Shore Flooding and Inundation Flooding	Highly Likely	Negligible to Major	High	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures, homes located in SFHA. People with disabilities and functional access needs.
Winter Storm (Ice Storm)	Highly Likely	Moderate to Major	High	Town forests and trails, rivers and stream, commercial agriculture, farms, livestock, residential gardens. Local wildlife populations. Recreation and agricultural economies. Residences, seasonal homes, roadways, utility lines, vehicles.
Lake Shore Erosion and Fluvial Erosion	Highly Likely	Negligible to Moderate	High	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures, homes located in SFHA. People with disabilities and functional access needs. Residences and seasonal homes along lakeshore, roadways, utilities.
Invasive Species	Highly Likely	Moderate	High	Town forests and trails, rivers and stream, commercial agriculture, farms, livestock, residential gardens. Local wildlife populations. Recreation and agricultural economies. Residences, seasonal homes, roadways, utility lines, vehicles.
Strong Winds (windstorm, tornado, tropical storm, thunderstorm, hurricane)	Highly Likely	Negligible to Moderate	Moderate	Falling limbs and/or trees, power loss, telecommunications loss, structural damage to commercial and residential structures, roof damage, older mobile homes, barns, barn roofs. Business losses from telecom outages.
Hazardous Materials	Occasionally	Negligible to Moderate	Low	Residential and seasonal homes, commercial structures, Town Office, Town Garage, Fire and Rescue Buildings, Post Office, Folsom School, utilities, and the environment. Transportation infrastructure along Route 2 including causeway.

Infectious Disease Outbreak	Likely	Minor to Major	Low	All sectors of the community especially people with disabilities or functional access needs, health center, town operations, schools and businesses.
Cold	Likely	Minor	Moderate	Power transformers, village water and sewer lines, residential and commercial structures, roads, culverts, Town Office, Fire and Rescue buildings, delivery services, livestock, pets, people with disabilities and functional access needs, HVAC workforce.
Heat	Likely	Minor	Moderate	Power transformers, village water and sewer lines, residential and commercial structures, roads, culverts, Town Office, Fire and Rescue buildings, delivery services, livestock, pets, people with disabilities and functional access needs, HVAC workforce.
Drought	Unlikely	Minor to Major	Low	Farms, livestock, residential gardens, forests, village water and sewer, residential and commercial wells structures, Town Office, Fire and Rescue buildings, pets, people with disabilities and functional access needs, HVAC workforce.
Hail	Occasionally	Negligible to Minor	Low	All public and private structures particularly roofs, vehicles, utilities telecommunications, crops and gardens.
Earthquake	Unlikely	Negligible to Major	Low	Infrastructure damage to transportation network. Structural damage to residences, commercial buildings, Town Office, Fire and Rescue buildings, Town Garage, Water and Waste Water Depts., and utilities. People with disabilities and functional access needs for evacuations or sheltering in place.
Wildfire	Unlikely	Minor	Low	Residential homes, commercial structures, utility poles and lines, road closures, fires in rural areas lacking fire breaks. People with disabilities and functional access needs for evacuations or air quality issues.
Landslides	Unlikely	Negligible	Low	There are no landslide areas in South Hero
Dam Failure	Unlikely	Negligible	Low	There are no dams in South Hero.

Major Disaster Declarations in Vermont

Refer to Appendix C for a list of active and previous disaster declarations.

2020 Pandemic

During the 2020 pandemic, the Town faced significant challenges such as limited local healthcare resources and economic disruptions, especially for small businesses. Social distancing measures led to the closure of local schools, restaurants, businesses, and shops, causing financial strain. The Town also saw shifts in community dynamics, with many residents relying more on neighbors and limited local services for support. The municipal offices adapted by finding ways to stay connected through continuity of operations planning that enabled staff to work remotely while still carrying out business operations, hold virtual governance committee meetings to conduct Town business, and implementing State protective

guidelines for municipal departments to ensure all departments could continue to operate safely. The lessons learned from 2020 will serve the Town well should another pandemic occur.

Climate Change

Climate change is real. The impacts are witnessed today, with more frequent and intense extreme weather events like heavy downpours, shorter frost-free growing season and warmer nighttime temperatures. Although South Hero contributes minimally to global climate change, it must address the local consequences by building resilience and capacity. These impacts pose challenges in terms of economic or infrastructure vulnerabilities, and for native species and habitats. While some effects of climate change may be positive, the negative impacts—such as threats to agricultural production, increased flooding, and reduced snow cover affecting winter recreation—are of serious concern for their economic, social, and environmental consequences.[1] Table 6 summarizes the future effects of climate change for South Hero.

Table 6: Future Effects of Climate Change by Hazard for South Hero, VT

Hazard Event	Future Effects of Climate Change
Winter Storm (Ice Storm)	Winter in Vermont has been reported to be warming 2.5 times faster than the global average annual temperatures since 1960, affecting the snow conditions for many sectors of the local economy. Winter storms may bring more rain than snow, strong winds, and flooding conditions due to decreased ground frost. Warming winters will have a significant effect on maple sugar production that relies on temperatures at or below 0°C / 32°F at night and above freezing during the day for sap to run. For the tourism sector, reduced snow packs will impact winter recreation on the lake with less snow mobile users, Nordic skiers, and could impact ice fishing and those traveling through the Town and frequenting local businesses. Climate change is projected to alter ice storms by increasing their potential intensity according to NOAA. Regions that traditionally experience heavy winter snowfall will more frequently hover near the freezing mark, transforming snow into freezing rain. Because a warmer atmosphere holds more moisture, future ice storms are expected to pack higher precipitation volumes. This increases the risk of heavier ice accumulations that can severely damage forest ecosystems, orchards, forests, and utility infrastructure like power, cable and fiber optic lines.
Invasive Species	Rising average annual temperatures will have potential impacts on forests and the ag sector of the local economy. Stress will occur on native species as the climate becomes more favorable for southern species. Local impacts will be on the forest products, agriculture, and tourism industry. Particularly concerning are pests like the Asian longhorned beetle (not yet found in Vermont), emerald ash borer, and hemlock woolly adelgid, which have already killed millions of trees across North America. Vulnerability: Agricultural losses, private property (crops, greenhouses, orchards, flower gardens, community trees). Overgrowth can impact powerlines and culverts.
Lake Shore Flooding and Inundation	An increase in annual precipitation rates due to climate change could potentially exacerbate inundation flooding. Since the 1960s, the state of Vermont has seen a 6” increase in average annual precipitation, attributed to the warming of the

[1] Vermont Climate Assessment, (2021) University of Vermont, Gund Institute for Environment.

Flooding	atmosphere and subsequent increased evaporation rates2. Such changes will impact road infrastructure and the storm water infrastructure and wastewater treatment. More residents could experience flooding on their properties where minor drainage issues now may exist. Buildings and home located near the lakeshore and streams may be a greater risk as frequency of flooding.
Lake Shore Erosion and Fluvial Erosion	An increase in annual precipitation rates could exacerbate fluvial and lakeshore erosion. Since the 1960s, the state of Vermont has seen a 6" increase in average annual precipitation, attributed to the warming of the atmosphere and subsequent increased evaporation rates3. Such changes will impact road infrastructure and the storm water drainage. More residents could experience erosion on their properties. Buildings and home located near streams may be a greater risk as frequency of erosion increase.
Wind (windstorm, tornado, tropical storm, thunderstorm, hurricane)	According to the NOAA, as the world warms, the jet stream is expected to get faster, with the fastest winds increasing by about 2% for every degree Celsius (1.8° F) of warming. This could lead to greater increase of high wind events and include record-breaking winds that could cause increased damages notably to rural roads in forested areas, electric utility infrastructure, tree damage, residential roof and siding damage particularly mobile homes, and flying debris.
Hazardous Materials	May increase the likelihood of hazardous materials incidents by causing more frequent and intense flooding, severe storms, and erosion that can damage storage facilities, transportation routes, and utility infrastructure. Floodwaters can spread contaminants over larger areas, increasing risks to public health, drinking water supplies, and natural resources. Above ground fuel storage tanks could become dislodged by rising waters. Higher temperatures may also increase the volatility of certain chemicals and place additional stress on storage and containment systems.
Cold	With the climate change trend being towards warmer temperatures, future extreme cold periods beyond the norm are unlikely.
Heat	Extreme, prolonged heat will impact the public health sector by placing those with functional access needs at risk; it will impact first response services and local health offices during long spells of heat. The Town will have to continue to monitor local capacities for their predefined cooling sites and first responder resources. Extreme heat can stress the electrical grid as more air conditioners will be put into use. Climate change may intensify mud season by causing earlier snowmelt and increased spring rainfall, leading to softer, more waterlogged soils that can severely damage unpaved roads and make them difficult and at times impassable to navigate for residents.
Infectious Disease Outbreak	The Vermont Department of Health defines an infectious disease as one that 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). Rising temperatures will enable more diseases and their carriers to

[2] https://climatechange.vermont.gov/vermont-today

[3] https://climatechange.vermont.gov/vermont-today

	spread further north, where harsh winter conditions previously limited their expansion. All sectors and populations of the community including essential services, ambulance service and local health offices, people with disabilities and functional access needs including elderly.
Drought	Warmer temperatures over prolonged periods without precipitation will lead to drought conditions. Warmer winters that lead to reduced snowpack would mean water sources are not getting recharged. This will impact those who rely on wells and impact the Town's water supply and distribution system. Drought conditions could also lead to increased wildfire risks which will impact the fire department resources and put private and public properties at risk.
Hail	Greater increase in hailstorm activity would increase damages to public infrastructure such as the public works vehicles, public building roofs, and private property.
Earthquake	No known impacts from climate change.
Major Fire - Wildland	Warming temperatures coupled with drought and greater frequency of wind could create a greater frequency of wildfires occurring. While much of the Town areas are developed, the likelihood of wildfire affecting them is very low. However, as has occurred in some suburban settings in Colorado in recent years, wildfire fueled by strong winds could cause damage to residential areas in the Town areas. This would impact the fire department and Vermont Electric Co-op infrastructure. The tourist economy could be impacted due to wildfire smoke. Segments of the population that have functional access needs, particularly those with respiratory issues, would be impacted creating increased demands on ambulatory and health care services.
Dam Failure	There are no dams located in South Hero. Climate change may increase the potential impacts of dam failure by contributing to more frequent and intense precipitation events, increased runoff, and flooding that can place additional stress on dam structures and downstream infrastructure.
Landslides	There are no know landslide areas in South Hero. Increased rainfall, particularly intense or prolonged storms, can saturate soil and destabilize slopes, while rapid snowmelt and ground frost thaw further contribute to ground instability.

Readers looking for additional information on ice jams should review the State Hazard Mitigation Plan.

Hazard Profiles:

Lakeshore Flooding and Flood Inundation – *High Risk*

Description: Flooding is the most widespread and destructive hazard in the United States. Flooding has also been the most common and costly hazard to affect South Hero. Flooding can occur anytime of the year because of heavy rains, thunderstorms, rapid snowmelt, tropical storms from hurricanes or Nor'easters. It can result from the overflow of major rivers and their smaller tributaries or inadequate local drainage. Historically, floods have been a factor in over 80% of all federally declared disasters. People living near bodies of water such as rivers, lakes, and streams are at greater risk from flooding than those not living in the floodplain.

The types of flooding that occur in South Hero include:

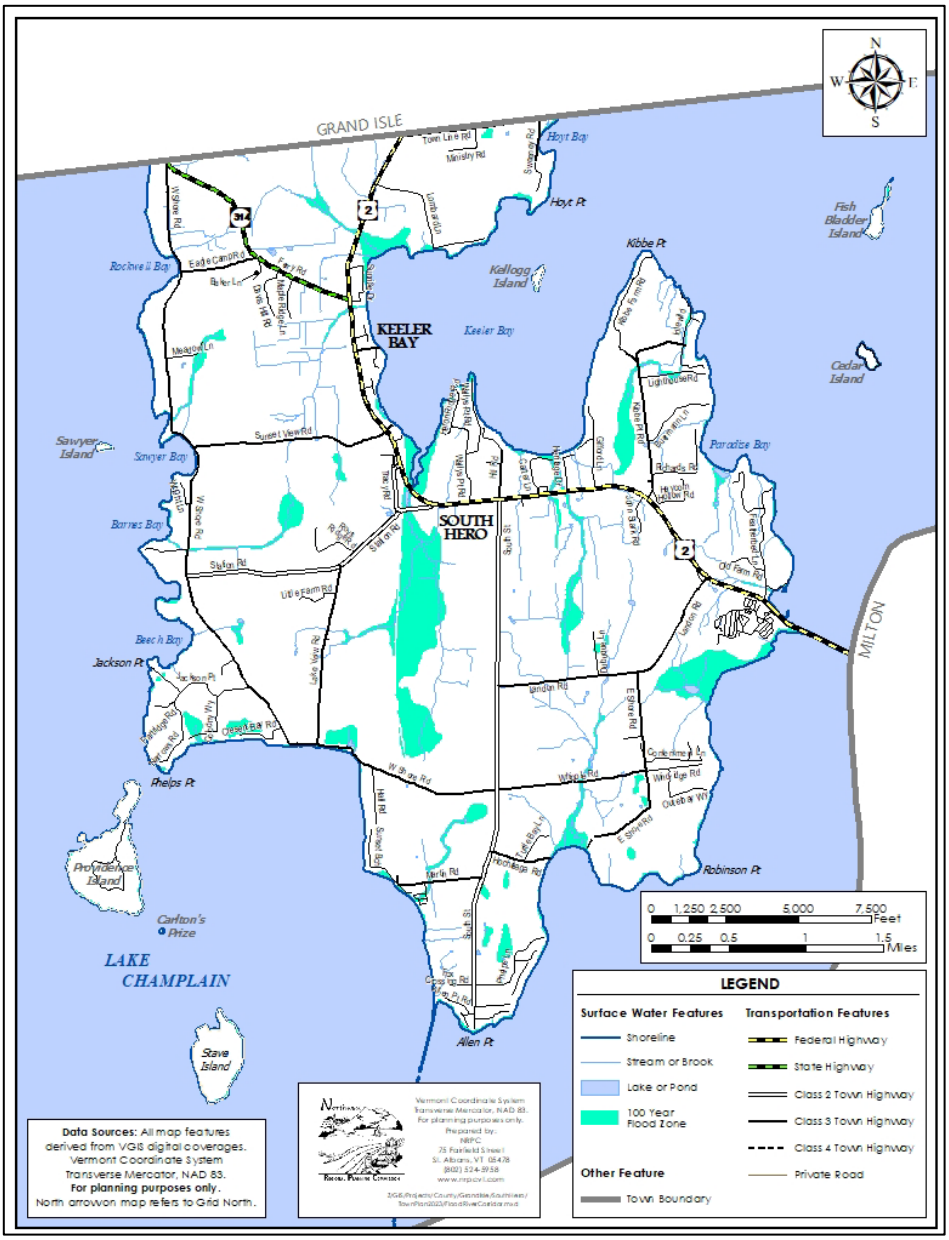
- **Inundation/Surface Water Flooding:** Occurs when heavy rain saturates the ground, causing water to pool in low-lying areas, especially in urban centers like Montpelier.
- **Flash Flooding:** Rapid, dangerous flooding that occurs within six hours of heavy rain, often transforming small, dry streams into torrents.
- **Stream (Fluvial) Flooding:** Occurs when streams overflow their banks, common during spring melt or following intense, widespread rainfall. There are no rivers in South Hero.
- **Lake Shore Flooding:** Lakeshore flooding refers to the inundation of coastal areas along lakes. In South Hero, it occurs when Lake Champlain water level exceeds the minor flood stage of 99.5 feet spilling over onto the low-lying land, roads, and shoreline properties due to a number of factors including heavy rainfall, snowmelt, strong winds, and changes in lake levels high seasonal water levels and strong wind-driven waves.

Location: Floods typically occur along drainage areas because of summer thunderstorm activity. Drainage ditches and culverts are the biggest concern for local flash flooding events. Areas in South Hero that are particularly susceptible include the south end of Keeler Bay, Wally's Point Road and U.S. Route 2 near Milton are and will continue to be the parts of South Hero most at risk for flooding from Lake Champlain.

The lake shoreline areas of South Hero are subject to periodic flooding caused by high water levels in Lake Champlain. Seasonal camps and private residences are clustered along the lake shore. The primary concentrations for these structures are along Keeler Bay, Rockwell Bay, Sawyer Bay, Barnes Bay, Beech Bay, Cooper Bay Paradise Bay, Hoyt's Point and Wally's Point. In addition, there are other areas, including tributaries to the lake, and two significant wetland areas; the South Hero Marsh Wildlife Area (the "Crick") and the Round Pond State Park. Swamp and wetlands that have been designated as within the 100-year flood levels.

Figure 7 depicts Flood Zones and River Corridors for South Hero. The data includes the special flood hazard areas and flood zones from FEMA's Flood Insurance Rate Maps (FIRM). The map was created using data from the Northwest Regional Planning Commission, Vermont Center for Geographic Information, Vermont Agency of Natural Resources and FEMA FIRMs.

Figure 3: South Hero Flood Zone



Probability: The committee categorized this lakeshore flooding and inundation flooding as *highly likely.* Inundation flooding can occur rapidly during heavy rainfall, snowmelt, lake ice melt, or more slowly in cases of prolonged rainfall. Floods in South Hero have occurred in every season of the year. Flooding in the spring is common and is caused by rainfall combined with snowmelt. Floods in late summer and fall are usually the result of above normal precipitation. Winter floods result from occasional thaws, particularly in years of heavy snow cover. Lakeshore flooding typically occurs in springtime during "ice out" conditions when Lake Champlain thaws during warmer months of March and April

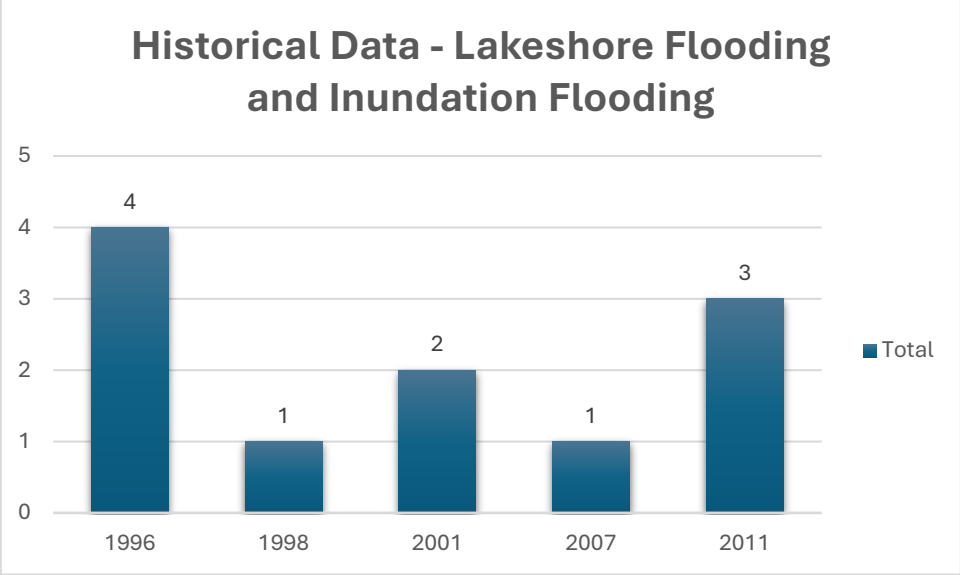
Extent: The Town of South Hero is in the unique position of being on an island, surrounded by Lake Champlain. The land is fairly flat, and there are few streams of any significance on the island. The result is that the island typically does not face catastrophic inundation resulting from single major storm events such as hurricanes. The flooding that does occur tends

to be from the rising waters of Lake Champlain. Such flooding tends to start slowly and last for an extended amount of time. Flooding can pose major transportation issues, property damage, and environmental damage to Lake Champlain.

There has been a total of 4 floods in South Hero over the last 30 years that have exceeded the USGS Major Flood Stage elevation (101.5 feet Above Sea Level) on Lake Champlain. The Lake has exceeded 100 feet in elevation approximately 12 times during that same time frame.

Approximately 5% of all structures in South Hero sit within the 100-year floodplain. Flooding in these areas causes critical issues with septic systems and can dislodge unsecured personal property, such as propane tanks. Private wells and septic systems are at risk during flood events.

Figure 4: Lakeshore flooding and Inundation Flooding History of Occurrences



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Figure 5: Lake Champlain Water Level Benchmarks

CATEGORY	STAGE
Major Flooding	**101 ft**
Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.	
Moderate Flooding	**100.5 ft**
Some inundation of structures and roads near stream.	
Minor Flooding	**99.5 ft**
Minimal or no property damage, but possibly some public threat.	
Action	**99 ft**
The level which, when reached by a rising stream, represents the level where the NWS or a customer/partner needs to take some type of mitigation action in preparation for possible significant hydrologic activity.	

There are no lake gauges in South Hero. The closest gauge at the Echo Center in Burlington and the highest recorded measurement was 103.27 feet, which was measured on May 6, 2011. The average height of the Lake is 95.5 feet.

Table 7: Top 10 Historic Crests of Lake Champlain (NOAA)

Rank	Water Level (Ft.)	Date of Crest
1.	102.67	May 6, 2011
2.	101.26 ft.	April 27, 1993
3.	100.43 ft.	May 15, 2000
4.	100.39 ft.	April 29, 2019
5.	101.23 ft.	April 24, 2008
6.	99.93	April 21, 2014
7.	99.54 ft.	May 4, 2018
8.	99.08 ft.	July 7, 2013
9.	98.94 ft	April 24, 2022
10.	98.64 ft.	May 5, 2023

Impact:

NOAA Flood Impacts of flooding along Lake Shore:

- 101.5' - Severe flooding occurs, with moderate to widespread inundation of lake side properties and closure of some low-lying roads.
- 100.5' - Flooding becomes serious, and wave erosion on windward shores becomes a problem. If lake ice is present, structural damage may occur.
- 99.5' - Minor flooding is expected with water beginning to enter some lake front properties. Water also begins to threaten low lying roads, piers, and docks. Wave action can compound flooding on windward facing shorelines.
- 99.0' - Minor shoreline flooding may occur under windy conditions where the action of waves may cause splash over on some low-lying lakeside properties.

The area's most vulnerable to flooding include the south end of Keeler Bay, Wally's Point, portions of West Shore Road, and U.S. Route 2 near Milton. During the 2011 flood, access to South Hero across the causeway from Milton on U.S. Route 2 was reduced to one lane due to flooding through the wildlife preserve at the State Park. A more severe flood could pose serious access problems for residents of South Hero. Flooding on U.S. Route 2 is of particular concern because there are only three means of vehicular access to the Town of South Hero from the mainland of Vermont or New York: from the north through North Hero, from the west via the Grand Isle Ferry from Cumberland Head, New York, or from the southeast via U.S. Route 2 through the wildlife preserve and Sandbar State Park in Milton. During the spring 2011 Lake Champlain flood event, rising waters reduced travel across the Route 2 causeway to a single lane for several weeks.

Town Vulnerability:

People: Residents in low-lying areas near the Lake Shore and tributary streams are vulnerable to property damage, displacement, transportation disruptions, and potential safety risks during major flood events. Flood events can cause injuries or fatalities to people who do not evacuate in time. Delayed evacuation can be caused by flash flood events, or by individuals who are hesitant to leave their houses. The elderly, the homeless, residents with special needs and those without proper transportation may potentially be impacted more than other residents.

Built Environment: Lakeshore flooding and inundation flooding events can cause damage to town and private property, including roads (i.e., Route 2 near Milton, parts of West Shore Road, parts of Keeler's Bay and Wally's Way Road), culverts, driveways, bridges, private wells, water and wastewater infrastructure, private septic systems, and buildings. These impacts could cause disruption of the transportation along US Route 2 to and from the community and county.

Natural Environment: Flooding can significantly impact the natural environment by destabilizing streambanks and shorelines, accelerating erosion, and increasing sediment transport that degrades aquatic habitats. Floodwaters can carry excess phosphorus, nutrients, pollutants, and invasive species into waterways, reducing water quality throughout the northern Lake Champlain watershed and increasing the likelihood of harmful algal blooms that threaten aquatic ecosystems, wildlife, domestic animals, and public health. These impacts can also damage wetlands.

Economy: Lakeshore flooding and inundation flooding can cause major economic impacts to the town. Impacts include disruption or closure of impacted businesses loss of tourist dollars, homelessness due to damages to residential structures, and recovery costs, including employee overtime, time and equipment spent on the repairs.

Potential Future Impacts:

Climate Change: Climate change is expected to increase the frequency and intensity of heavy precipitation events, resulting in stronger, slower-moving storms, more frequent stream and lakeshore flooding, and longer periods of saturated soils. These conditions increase the likelihood of flooding, damage to roads, bridges, culverts, stormwater infrastructure, and wastewater systems. , As flooding becomes more widespread, properties that have not historically been at risk—including those along streams, and the Lake Champlain shoreline—may experience flooding more frequently, potentially increasing the need for property acquisitions or buyouts. Agricultural operations are also expected to face greater losses from saturated soils, delayed planting and harvesting, crop damage, and increased erosion of productive farmland.

Changes in Land Use / Development: The establishment of the Flood Hazard District within South Hero's Subdivision and Zoning Bylaws enables the Town to qualify for participation in FEMA's National Flood Insurance Program (NFIP). This program allows property owners within the designated Flood Hazard District to purchase flood insurance. The district is intended to prevent increased flooding risks resulting from development in flood-prone areas, minimize future public and private losses due to flooding, and promote the health, safety, and general welfare of the community. Changes in land use and development are not expected to increase the risk of inundation flooding for current or future assets.

Changes in Demographics: South Hero has experienced steady population growth (12% increase of residents over age 65 in recent years) and remains attractive to families because of its location near Chittenden County's employment market. Repeated flood events and increasing flood-related costs could discourage development in high-risk areas. Older residents can be disproportionately affected by flooding because evacuation, recovery, and home repairs may be more difficult. Older adults, lower-income households, and residents with limited resources may face greater challenges recovering from flood damages.

History: See Appendix F for history of Inundation flooding and lakeshore flooding.

Winter Storms (Ice Storm) – *High Risk*

Description: Winter storms with snow, ice and freezing temperatures in various combinations are fairly common in South Hero. Such storms are accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chill. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Winter storms can cause roofs to collapse and limit access to areas and buildings around Town. Extreme cold often accompanies a winter storm or is left in its' wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening.

A **Nor'easter** is a large coastal storm that forms along the Atlantic coast and produces strong northeasterly winds, heavy precipitation, and prolonged impacts such as snow accumulation, ice storms, strong winds, and flooding. In Vermont,

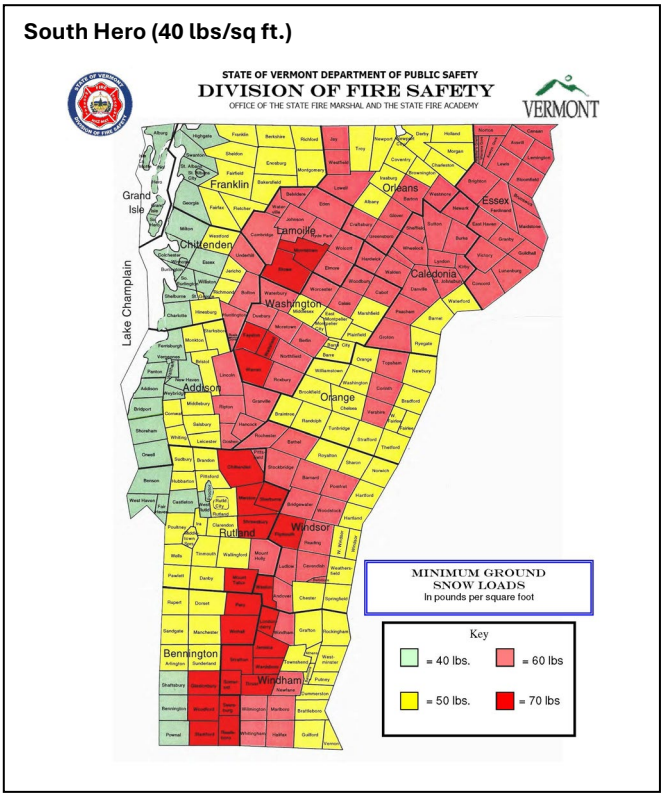
Nor'easters are a major source of winter weather hazards and can affect entire communities through power outages, hazardous travel conditions, and damage to infrastructure.

The National Weather service defines a **blizzard** as "a storm which contains large amounts of snow or blowing snow, with winds in excess of 35 mph and visibilities of less than 1/4 mile for an extended period (at least 3 hours)."

An **ice storm** is a winter weather hazard characterized by the accumulation of freezing rain that forms a layer of ice on surfaces.

Construction standards for snow load (see map) indicate that structures in South Hero should be built to withstand loads of 40 pounds per square foot. This would indicate an average depth of snow of 40 inches or 10 inches of ice on a square foot of roof surface. At that point, design standards would be exceeded, and the structure runs the risk of collapse. Given this standard, a snowstorm which dumped 40 inches of snow or 10 inches of ice would likely result in a few collapsed roofs, especially on structures which are not built to these standards.

Figure 6: Minimum Snow Loads for Construction



Location

A winter storm has the potential to affect all areas of South Hero, making it a town-wide hazard rather than one confined to a specific location. Heavy snow, ice accumulation, freezing rain, strong winds, and extreme cold can impact residential neighborhoods, village areas, roads, agricultural lands, public facilities, and utilities throughout the community. Higher-elevation and more remote areas may experience greater snow accumulations and more difficult travel conditions especially in eastern areas of Town. Widespread power outages can occur from downed trees and utility lines. Because winter storms affect the entire town simultaneously, all residents, businesses, and critical facilities in South Hero are considered exposed to this hazard.

Probability

The probability of winter storm (ice storm) is considered *highly likely* by the committee. Winter Storms occur annually in South Hero, typically in the form of a Nor'easter. Nor'easters are more common and occur most often in the winter and early spring, but also sometimes during the fall. These storms can leave inches of rain or several feet of snow, and sometimes last for several days.

Blizzards occur less frequently and can cause hazardous travel conditions, road closures, power outages, damage to infrastructure, and disruptions to emergency services, affecting entire communities Even less common but potentially more damaging are ice storms which can negatively affect the entire community by creating dangerous travel conditions, damaging trees and utility infrastructure, disrupting essential services, and causing prolonged power outages during cold weather.

Extent: Some of the worst historical winter storms in South Hero have left snow depths of 14" (March 2001), wind speeds up to 40 mph (January 1998), and ice accumulations of 2-4" (January 1998 and December 2013). The ice storm of January 4 – 8, 1998, was the worst recorded ice event in the Town's history as well as all of the northeast included Quebec Canada. Roads were impassable due to ice accumulations. Power poles and lines were downed. Electricity was out for the several days following the event. Waterlines froze. Emergency shelters were opened. The National Guard was activated to assist in recovery efforts.

Figure 7: Ice Storm Damage.



South Hero's recent history, since the 1998 ice storm, has not recorded any loss of life or structural damage to public assets due to winter storms (ice storms). These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

The Town highway department is equipped to handle most winter emergencies, including maintaining road accessibility through various snow and debris removal equipment. The Town has access to private machinery, including bulldozers, plows, ATVs and snowmobiles, should they be needed in the event of an emergency. Heavy wet snows occurring during early fall and late spring and ice storms in the winter months are the cause of most power failures. There are emergency generators available to provide power to the town office, school and fire station.

Figure 8: Seasonal Record Snow Falls, Burlington, Vermont (NOAA, BTV)

Top 10 Fall Snowfall Totals					
Fall (September – November)					
Highest			Lowest		
Rank	Snowfall	Year(s)	Rank	Snowfall	Year(s)
1	24.0”	1900	1	0	2009/1948/1937/1915
2	23.0”	1921	2	0.1”	2004
3	21.9”	1906	3	0.4”	2010/1953/1930
4	20.4”	2002	4	0.5”	2003/1946/1941/1934/ 1918
5	19.4”	1910	5	0.7”	1999/1960/1894
6	19.2”	1971	6	0.8”	1982
7	18.8”	1968	7	0.9”	1988/1929
8	16.1”	1997	8	1.0”	1931
9	16.0”	1977	9	1.3”	1964
10	15.6”	1969	10	1.4”	1939
Winter (December – February)					
1	103.4:	2007-08	1	18.4”	1912-13
2	97.9”	2010-11	2	20.6”	1979-1980
3	96.9”	1970-71	3	21.9”	1928-29
4	90.1”	2009-10	4	23.6”	1936-37
5	81.7”	1965-66	5	24.0”	1898-99
6	80.7”	2003-04	6	25.0”	1904-05
7	80.0”	1957-58	7	25.6”	1940-41
8	79.4”	2008-09	8	26.7”	2011-12
9	78.6”	1946-47	9	27.4”	1960-61
10	75.1”	1969-70	10	27.5”	1988-89
Spring (March – May)					
1	52.7”	1933	1	0.1”	1945
2	47.8”	2001	2	1.0”	1903
3	45.7”	1971	3	2.0”	1910
4	37.7”	1974	4	2.7”	1927
5	36.4”	1916	5	3.1”	1934
6	36.1”	1997	6	3.2”	1991
7	34.4”	1994	7	3.9”	1946
8	33.9”	1983	8	4.0”	1905
9	31.0”	2007/1972	9	4.1”	1915
10	30.1”	2011	10	4.2”	1921

Impact: The impact of winter storms (ice storms) is considered *limited to major* by the committee based on history. The primary impacts of a storm typically include the disruption of transportation networks, school closings and occasionally telecommunications and power outages. Vulnerable populations such as the elderly, those dependent on medical equipment and specialized health or physical care are at risk to winter storms. Also at risk are farms and associated

structures and livestock. Barns can collapse due to heavy snow loads. Dairy cattle are susceptible to mastitis if they are unable to be milked. The town is able to keep the roads open and treated for most storms and any loss of power is usually limited to hours, except during the Ice Storm of 1998 when most of the town was without power for three to four days.

Town Vulnerability

People: Winter storms (ice storms) can cause injuries or fatalities to people who cannot or do not shelter-in-place, or who do not have adequate shelter. Delayed sheltering-in-place can be caused by no-noticed events, or by individuals who do not heed the warning. The elderly, the unhoused, residents with special needs and those without proper transportation may potentially be impacted more than other residents. Some residents in Hoyt Point have asked the town to help plow their driveways during some severe winter events as they were unable to due to the amount and type of snow.

Built environment: Winter storms (ice storms) can cause damage to town and private property, including buildings (roof collapse), blocked egress routes, blocked evacuation routes, frozen pipes, downed powerlines, and road infrastructure including Route 2. Drifting snow can be problematic in some areas of town along West Shore Road, East Shore Road and Hoyt Point, Allen Point and Robinson Point. Impacts from severe winter storms could cause disruption of the transportation system to and from the community and county. Cable, fiber and power lines could be damaged disrupting businesses, telehealth and tele education opportunities for residents.

Natural environment: Winter weather and ice storms events can cause damage to the environment with downed trees. Areas in town that may be more vulnerable are those areas where the utility company hasn't maintained utility corridor along East Shore Road and Hoyt Point, Allen Point and Robinson Point.

Economy: Winter weather and ice storms events can cause economic impacts to the town. Impacts include disruption or closure of impacted businesses, and recovery costs, including employee overtime, time and equipment spent on the repairs. Commuters may be unable to get to and from work. Schools and businesses may be closed. Delivery of fuels and goods to and from town may be interrupted. Power could be disrupted causing disruptions in financial transactions for stores and restaurants.

Potential Future Impacts:

Climate Change: Winter in Vermont has been reported to be warming 2.5 times faster than the global average annual temperatures since 1960[4]. Typical winter weather conditions will be impacted including river ice reductio and shifting agricultural production times. Warmer winters will also mean that ground freezing will likely be impacted, and rain precipitation could saturate soils causing more flooding. Warmer winters will affect crucial Vermont industries like maple sugaring. Maple sugaring relies on a specific temperature range for sap to flow, typically occurring when nighttime temperatures drop below freezing (0°C / 32°F) and daytime temperatures rise above freezing. Warming winters will also impact the tourist industry for those traveling through town to for winter recreation opportunities such as snow mobiling, ice skating, Nordic skiing, and ice fishing.

Changes in Land Use/Development: As South Hero continues to grow there will be an increase in the number of people, structures, and critical facilities exposed to severe winter weather. New development may place additional demands on transportation networks, utility systems, and emergency services. Conversely, resilient development practices, redundant energy systems, scheduled equipment maintenance, capital planning and land-use planning can reduce South Hero's vulnerability by improving access, minimizing power disruptions, and enhancing the community's ability to withstand and recover from winter storm impacts.

Changes in Demographics: As South Hero's population continues to grow, there will be greater demands on road maintenance, emergency response, sheltering, utility restoration, and public safety services during snowstorms, ice storms, and blizzards. An aging population may increase the demand for emergency assistance, medical

[4] Vermont Climate Assessment (2021), University of Vermont, Gund Institute for Environment.

services, and accessible transportation during severe storms, while population growth can place additional pressure on infrastructure and emergency response resources. Increases in populations with disabilities and functional access needs, such as individuals with limited mobility, may also increase the challenges associated with preparedness, response, and recovery from winter storm events.

See Appendix F for history of winter storms (ice storms).

Lake Shore Erosion and Fluvial Erosion – *High Risk*

Description: Lakeshore erosion is the gradual or rapid deterioration and recession of shoreline soils and sediments by wave action, fluctuating water levels, ice movement, wind, and storm events. This natural process can be accelerated by flooding and freezing and thawing of lake ice.

Fluvial erosion is the wearing away and collapse of riverbanks and stream banks caused by the natural movement and adjustment of rivers and streams. It typically occurs when a stream becomes unstable and has more energy than is needed to carry its sediment load, often due to channel alterations or runoff events that increase water velocity. Factors contributing to lake shore and fluvial erosion risk in South Hero include intense rainfall events, saturated soils, snowmelt, and channel constrictions at bridges or culverts, land use practices, agricultural activities, and loss of riparian vegetation can further reduce bank stability.

Location: Lake shore erosion occurs in areas similar to flooding along Lake Champlain. The primary concentrations for seasonal camps and private residences along the lake shore include Keeler Bay, Rockwell Bay, Sawyer Bay, Barnes Bay, Beech Bay, Cooper Bay Paradise Bay, Hoyt's Point, and Wally's Point. Local conservation efforts have specifically identified Sunrise Drive with multiple private shoreline properties in this area experiencing beach erosion and land loss. In Keeler Bay, several properties and recreational areas bordering the sheltered eastern bay deal with runoff-related debris, soil loss, and nutrient loading. The South Hero Town Beach (White's Beach) has suffered severe shoreline erosion in recent years. The loss of stabilizing, mature cottonwood trees to wave and ice battering has worsened land stability in the area.[5]

Fluvial erosion occurs along several small streams, tributaries and ditch lines that drain into Lake Champlain including Keeler Bay, south from Landon Road, Whipple Road and East Shore Road, southwest from Martin Road, west to Barnes Bay, and east into Apple Bay Marina. Fluvial erosion occurs from the South Hero Marsh Wildlife Area where it empties on the north side of U.S. Route 2 in Keeler Bay, just west of South Hero Village, and extends southerly nearly to West Shore Road.

There are no rivers in South Hero.

Probability: The committee classified the probability of lake shore erosion and fluvial erosion as *highly likely* occurrence in South Hero. South Hero has few high-gradient streams and lacks the steep, confined river valleys where fluvial erosion is most common. While localized streambank erosion can occur during heavy rainfall or spring snowmelt, particularly at culverts, road crossings, and drainage ditches, widespread fluvial erosion is uncommon because there are no rivers in South Hero.

[5] South Hero Land Trust (2024). *Keeler Bay Action Plan.*

Extent: In Vermont, most flood-related damage occurs outside the Special Flood Hazard Areas, much of which is due to the erosive power of water causing damage to critical public infrastructure such as roads and stream-crossings. Where stream meanders are confined by human activity, streams lose their equilibrium and become steepened, straighter and more powerful. The more powerful the flooding stream the higher the risk for damage.

The extent of fluvial erosion in South Hero's drainage ditches and streams is generally limited to localized areas, but it can become moderate during periods of heavy rainfall, rapid snowmelt, or intense storm event. Fluvial erosion causes severe damage to critical public infrastructure—such as roads, bridges, culverts, and stream-crossings—as well as homes, businesses, and community buildings located near rivers. Eroded material (sediment and debris) washes downstream to lower-gradient reaches, clogging channels and forcing rivers outside their banks, triggering additional flooding.

Lakeshore erosion affects shoreline properties and downstream areas where eroded sediment settles. Winter and spring ice action can exert massive physical force against shorelines, gouging banks and eroding shorelines and beaches. High water levels combined with severe windstorms concentrate heavy wave energy against shorelines, dramatically increasing instantaneous soil loss. Once topsoil and shoreline land detach and wash away, the land loss is often permanent unless major structural or nature-based engineering solutions are implemented. Natural ecosystem recovery and vegetation re-establishment can take years to decades.

Lakeshore erosion is an ongoing, multi-year to multi-decade process driven by water level fluctuations, wave action, and loss of stabilizing shoreline vegetation. Intense storms, severe spring ice pushes, and rapid runoff cause sudden, highly destructive erosion over the span of hours to days.

The Vermont State Hazard Mitigation Plan notes that greater than 75% of flood damages in the state, measured in dollars, is associated with fluvial erosion rather than inundation flooding.

The purpose of the river corridor zone is to identify the space a river needs to re-establish and maintain stable "equilibrium" conditions. In other words, if the river has access to floodplain and meander area within this corridor, the dangers of flood erosion can be reduced over time. Under Act 250, the river corridor serves as the erosion hazard floodway. River corridors are mapped specifically to encompass areas where fluvial erosion, channel evolution and down-valley meander migration are most likely to occur.[1] For streams with a drainage area ≤ 2 square miles, a default 50-foot setback is used because these smaller drainages do not typically create fluvial erosion hazards unless evidence suggests otherwise.

The standard 50-foot setback will meet the state's river corridor objectives in most cases and is intended to simplify the mapping and administration of corridor protections. In site-specific applications, ANR may delineate, or project proponents may provide the field data to define, a corridor for a small stream that may expand the setback from the 50-foot mark.

Figure 10 is a map depicting stream buffers as they pertain to South Hero which lacks a river, hydrologically connected roads, wetlands and the lake shore protection area. The map was created using data from Vermont's Open Geodata Portal and ANR's Natural Resources Atlas. This mapping assists municipalities in developing bylaws and effective mitigation strategies to regulate development within river corridor zones. The map depicts the drainage areas that are ≤ 2 square miles with a default 50-foot setback that VT ANR has designated (in orange). Lake shore protected zones are classified as the Shoreland District which is 500 horizontal feet measured from the 95.5-foot mean water level (gray) and hydrologically connected road segments (purple).

Figure 9: Hydrologically Connected Roads

In Vermont, a *hydrologically connected road* is a municipal road segment where stormwater runoff exhibits a continuous flow path to natural streams, lakes, ponds, or wetlands. These segments are mapped into 100-meter sections by ANR and are subject to the Municipal Roads General Permit (MRGP) to reduce water pollution.

A municipal road is classified as hydrologically connected if it meets any of these criteria:

- The road is within 100 feet of a perennial or intermittent stream, lake, pond, or wetland.
- The road bisects (cuts directly through) water or a defined stream channel.
- The road is uphill from, and drains directly into, a road that bisects water or a defined channel.

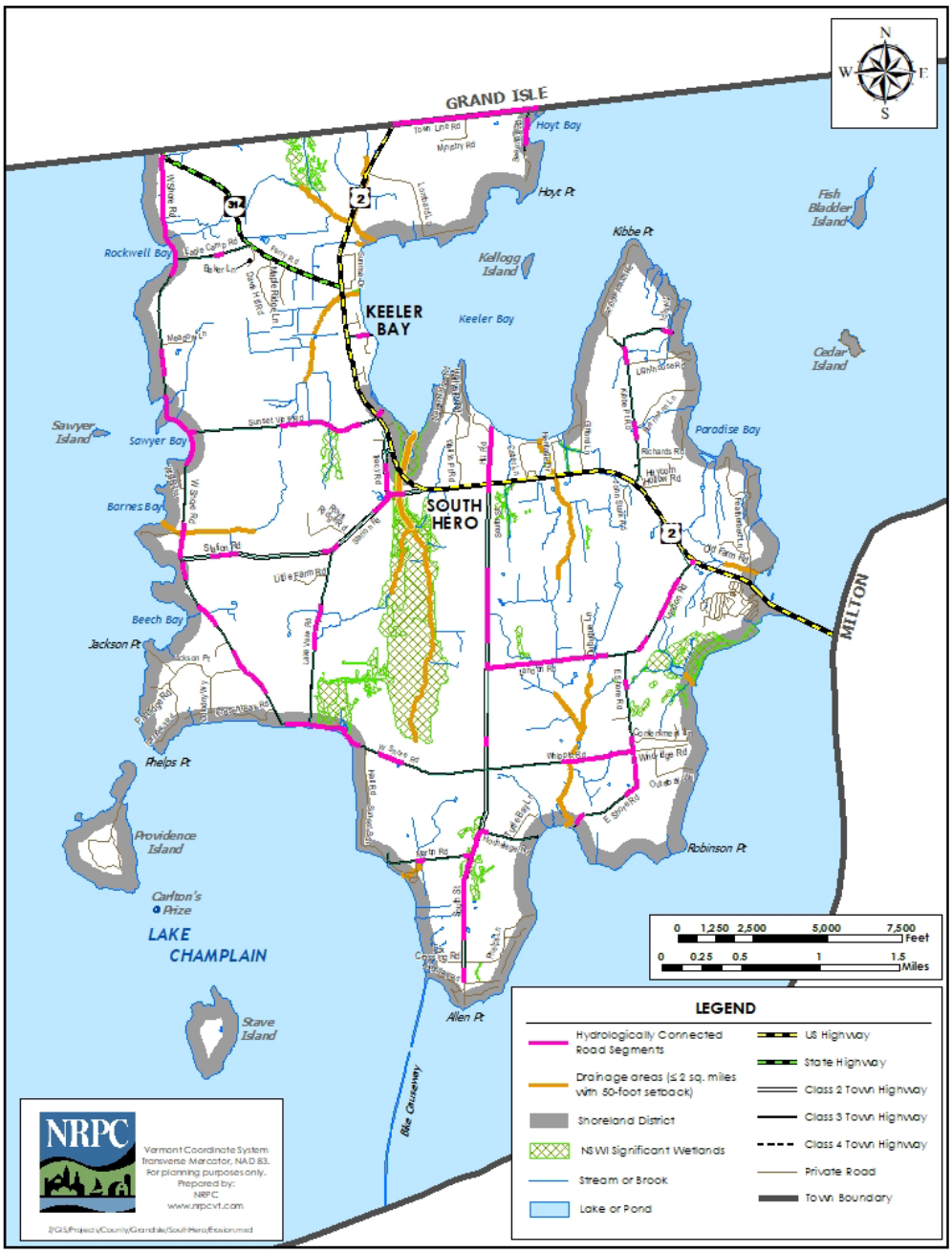
These roads require strict environmental Best Management Practices (BMPs), such as properly stabilized ditches, grass-lined turnouts, and correctly sized culverts, to filter out sediment and prevent erosion before the water reaches local waterways

Impact: The potential impact of lakeshore erosion and fluvial erosion was classified as *moderate* by the Committee. The Town's extensive shoreline along Lake Champlain is regularly exposed to high water levels, wave action, ice movement, and wind-driven storms. South-facing shorelines, including areas such as White's Beach and sections of West Shore Road, have experienced documented erosion and shoreline undercutting, while the May 2018 windstorm caused significant shoreline damage and erosion along the Colchester–South Hero Causeway. Sunrise Dive has multiple private shoreline properties that are experiencing beach erosion.

Fluvial erosion most commonly occurs where roadside drainage ditches, culvert outlets, and small channels convey concentrated runoff, resulting in scour, sediment deposition, and damage to road shoulders and drainage infrastructure. Because South Hero is relatively flat and lacks large, steep river systems, erosion is typically confined to drainage networks rather than widespread streambank failures. The Town has addressed these vulnerabilities through improved ditch stabilization, stone-lined channels, upgraded culverts, and stormwater management projects that reduce erosion and protect water quality in Lake Champlain

To protect the Lake Champlain shoreline and recognize its diverse and unique character, the Town Planning Commission and Conservation Commission keeps appraised of lakeshore land use and identify shoreland areas that may be treated differently in the Town regulations. South Hero has a designated Shoreland Land Use Planning Area that includes land within 500 horizontal feet measured from the mean water level (95.5 feet above sea level) on the shoreline of Lake Champlain within the Town of South Hero. The purpose of this Land Use Planning Area is to carefully evaluate development in order to protect water quality, scenic beauty and to control development along public waters in the best interest of the community. Some parcels or portions of parcels within this district may be limited in their suitability for development.

Figure 10: Grand Isle Erosion Risk Map



Town Vulnerability:

People: Those who live or work near along the Lake Champlain shoreline are most vulnerable to lakeshore erosion. Erosion can create unsafe conditions by undermining shorelines, limiting access to homes and public areas, and increasing the risk of injury during periods of high water, strong winds, lake ice melt or storm events. The risk to people from stream and drainage ditch erosion is relatively low because these areas are generally small and localized, though heavy rainfall can temporarily create hazardous conditions near roads, culverts, and crossings. Overall, erosion presents an occasional public safety concern, primarily affecting shoreline residents and visitors

rather than the community as a whole. Older adults may also require additional assistance during emergency response and recovery efforts, especially if transportation routes are disrupted.

Built Environment: Roads, bridges, culverts the US Route 2 causeway, the Colchester to South Hero bike causeway, utilities, and buildings are susceptible to undermining, washouts, and structural damage caused by erosion. Continued shoreline recession can undermine building foundations, erode road embankments, expose or damage private water and septic systems, and utility infrastructure. It can increase maintenance and repair costs.

Natural Environment: Erosion Increases sediment and nutrient runoff into Lake Champlain, degrading water quality, and contributing to harmful algal blooms. Erosion can destroy wetlands, riparian vegetation, and wildlife habitat while destabilizing shorelines and streambanks. The loss of natural vegetation also reduces the landscape's ability to filter pollutants, absorb stormwater, and protect against future erosion.

Economy: Erosion can result infrastructure repairs, property losses, emergency stabilization measures, agricultural land loss, and maintenance expenses for the Town of South Hero. Lakeshore erosion can reduce property values, increase maintenance and repair costs for roads and utilities, and require expensive shoreline stabilization projects. Damage to beaches and marinas may reduce visitor spending and impact local businesses that rely on seasonal tourism. Additionally, municipal expenditures for emergency response, infrastructure repairs, and erosion mitigation can place added financial strain on the Town budget and divert resources from other community priorities.

Potential Future Impacts:

Climate Change: South Hero is uniquely vulnerable to climate impacts because of its location on Lake Champlain and the high number of shoreland properties. re frequent heavy rainfall events will increase runoff, causing greater erosion in roadside ditches, culverts, and small streams. Fluctuating Lake Champlain water levels, stronger wind events, and more intense wave action will accelerate shoreline erosion. Warmer winters and repeated freeze/thaw cycles may further destabilize streambanks and shorelines, increasing sediment transport and cause town infrastructure damage. These changes are expected to increase maintenance costs for roads, threaten waterfront properties and degrade water quality.

Change in Land Use/Development: Increases in development can increase the risk of erosion in ditches and streams through stormwater runoff of impervious surfaces with the addition of paved roads, driveways rooftops and parking areas. Development along the shoreline can reduce the ability of natural buffers to stabilize the shore and absorb wave energy. The town does have regulations to protect the shoreline when properties are developed. There are no large-scale developments being proposed in South Hero in the near future along the shoreline.

Changes in Demographics: South Hero's population continues to show gradual growth driven by suburbanization from nearby employment opportunities in Chittenden County. The town has seen an increase in commuters and working-age families seeking rural residential settings and lower housing costs comparatively. This will likely increase risk to erosion hazards by expanding residential development into lakeshore and stream-adjacent areas. An aging population may increase vulnerability, as older residents may be less able to respond to emergencies or relocate from erosion-prone areas.

History:

See Appendix F for history of lake shore erosion and fluvial erosion.

Strong Winds (Windstorm, Thunderstorms, Tornado, Tropical Storm, Hurricane) – *Moderate Risk*

Description: FEMA's National Risk Index defines severe winds as damaging winds that exceed 58 mph. Locally, wind- caused damages have occurred with sustained winds greater than 30 mph with gusts greater than 40 mph. Strong winds pose a threat to lives, property, and vital utilities primarily because of flying debris or downed trees and power lines.

Strong wind can be the result of the following:

- **Wind Storm:** high wind event without precipitation.
- **Thunderstorm:** high wind event with the potential for compounding impacts due to precipitation (i.e. flood inundation, fluvial erosion, lightning, and/or hail).
- **Tornado**: a violent rotating column of air extending from a thunderstorm, not common in Vermont.
- **Hurricane/Tropical Storm:** the most significant impacts from hurricanes/tropical storms in Vermont are inundation flooding and fluvial erosion. Wind implications of hurricanes/tropical storms are addressed below.

Wind Storm: The National Weather Service (NWS) issues a Wind Advisory when winds are sustained at 31 to 39 mph for at least one hour or any gusts from 46 to 57 mph. The NWS will issue a High Wind Warning for wind speeds that are 58 mph or higher. Additionally, the NWS also has classifications for Tropical Storm Wind Warning and Hurricane.

Thunderstorm: Thunderstorms vary in size and type, each posing unique hazards. They can produce powerful downburst winds known as microbursts and macrobursts, which radiate outward from the base of a storm and can exceed 80 mph, with microbursts being particularly dangerous to aircraft due to their concentrated impact area. Ordinary cell thunderstorms consist of a single updraft and downdraft, bringing strong winds, rain, lightning, and hail. In contrast, multicell cluster thunderstorms contain multiple ordinary cells and are especially prone to flash flooding. Squall line thunderstorms form long, narrow bands—sometimes over 100 miles—with their strongest winds and rains concentrated at the leading edge. The most intense and destructive type is the supercell thunderstorm, which can last the longest and is responsible for nearly all tornado formation, along with producing lightning, hail, and flash flooding. (see: Hail and Lakeshore and Inundation Flooding & Lakeshore and Fluvial Erosion).

In South Hero, strong winds typically occur alongside severe thunderstorms, with straight-line winds often causing the majority of thunderstorm-related wind damage. These winds can be mistaken for tornadoes due to the comparable wind speeds and damage patterns, but unlike tornadoes, they do not involve rotating air. While thunderstorms and their associated hazards can happen at any time of year, they are most common during the spring and summer months.

Tornado: A tornado is a rapidly rotating column of air that extends from a thunderstorm to the ground, capable of causing extreme destruction. The most intense tornadoes can produce wind speeds exceeding 250 mph, leaving damaged paths that may span over a mile in width and stretch up to 50 miles in length. Tornado intensity is measured using the Enhanced Fujita Scale, which rates wind speeds on a scale from EF0 to EF5.

Hurricane/Tropical Storm: A hurricane is a tropical cyclone with sustained winds that have reached speeds of 74 mph or higher. A storm reaches hurricane status only after strengthening over a period of days or even weeks. A tropical storm has a maximum sustained wind speed of 39 to 73 mph and typically forms over warm ocean waters. As a hurricane moves to coastal areas, wind speeds decrease, and the hurricane may be downgraded to a tropical storm. This is the case in many of the tropical storms that have reached Vermont. The Atlantic Ocean hurricane season occurs approximately from June 1 through November 30, with most of the hurricane activity occurring between mid-August through October.

Hurricanes and tropical storms are hazard events that often result in strong winds, inundation flooding, and lakeshore and fluvial erosion impacts. The topography and landscape in South Hero contributes to the risk associated with these three hazard impacts (refer to Lakeshore Flooding and Inundation Flooding and Lakeshore Erosion and Fluvial Erosion hazard profiles).

Location: Strong winds events affect the entire town. In Particular, windward shore lines of prevailing westerly and southerly winds take the brunt of wind force.

Probability: The probability of a strong wind (windstorm, thunderstorm, tornado, tropical storm) event in South Hero is considered *high likely* based on history. Hurricanes have never occurred in South Hero, but tropical storms have. NOAA's National Climatic Data Center records indicate that Grand Isle County has experienced 29 high wind including thunderstorm wind events over the past 30 years resulting in over $2,900,000 in cumulative property damage and $285,000 in crop damages.

On August 16, 2007, the South Hero Fire Chief reported a short-lived funnel cloud near Keeler Bay along Route 2.

The Town has experienced five tropical storms and their remnant since 2004, with varying degrees of impact with the worst being in 2017 where multiple broken poles and downed lines that caused power disruptions for several days.

Extent: NOAA storm event reporting defines wind categories as follows:

High Wind: Sustained non-convective winds of 40 mph (35 knots) or greater lasting for 1 hour or more, or wind gusts of 58 mph (50 knots) or greater. These winds are not directly associated with thunderstorms.

Strong Wind: Non-convective winds below High Wind criteria but still capable of causing damage or disruption. Typically includes sustained winds or gusts between 40 and 57 mph that result in impacts.

Thunderstorm Wind: Convective wind produced by a thunderstorm with measured or estimated gusts of 50 knots (58 mph) or greater, or winds causing damage consistent with those speeds. Thunderstorm Wind is one of NOAA's primary severe weather event categories.

Figure 11: Beaufort Wind Scale (NOAA)

Force	Wind (Knots)	WMO Classification	On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, Smoke rises vertically.
1	1-3	Light air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh breeze	Moderate waves 4-8 ft taking longer form, may whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests beginning to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress

9	41-47	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs.
10	48-55	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, “considerable structural damage”
11	56-63	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility reduced	Widespread structural damage.
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	Widespread structural damage.

Strong winds (windstorm, thunderstorm, tornado, tropical storm) can and have occurred throughout the town. Weather systems generally come in from the west as systems build in the Great Lakes region and Ontario and travel through the Adirondacks in New York and across Lake Champlain. Systems occasionally arrive from the south from the mid-Atlantic region or rarely from the east.

According to NOAA, strong winds can damage roofs, windows, and siding, and can cause structural damage to roofs at 55–63 mph. Homes with siding are particularly vulnerable to wind damage, and stucco can also be damaged by water. For mobile homes winds can cause serious damage to anchored mobile homes at speeds over 80 mph and can destroy poorly constructed or unsecured mobile homes at speeds of 60 – 73mph.

Strong wind events often accompany thunderstorms. Lightning strikes in Grand Isle County average between 4-6 strikes per square mile each year based on data collected by NASA ‘s Earth information System. Within South Hero, the low estimate for lightning strikes on land is 60 strikes per year, and the high estimate is 90 strikes per year on land.

There have been 141 thunderstorm events in the region (Grand Isle, Franklin and Chittenden Counites) in the past 58 years according to the National Climatic Data Center. Of those, 77 are classified as severe thunderstorms with wind speeds of 50 kts or greater. Participants estimate that thunderstorms with accompanying strong winds occur at least once per year, typically between May and August.

Tornadoes can occur any time of the year under the right conditions but occur typically between March and August. According to the State Hazard Mitigation Plan, Vermont has experienced 49 tornadoes, 14 of which were magnitude F2 (significant) and 19 magnitude F1 (moderate) on the Enhanced Fujita Scale. F2 tornadoes have maximum wind speeds of 111 to 135 mph, while F1 tornadoes range from 86 to 110 mph. In 2026, 3 tornados were confirmed by the NWS in other areas of the state.

Figure 12: Enhanced Fujita Scale (Source NOAA)

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).

Hurricanes have never occurred in Vermont due to the state's location far from the Atlantic coastline. In general, severe hurricanes are not considered likely, nor do they pose a recurring threat for South Hero.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based only on a hurricane's maximum sustained wind speed. *This scale does not take into account other potentially deadly hazards such as flooding, and tornadoes.*

Figure 13: Saffir Simpson Hurricane Scale

Tropical Depression: ≤ 38 mph, ≤ 33 knots, ≤ 62 km/h		**Tropical Storm: 39-73 mph, 34-63 knots, 63-118 km/h**
Category	**Sustained Winds**	**Types of Damage 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 framed 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 or higher 137 kt or higher 252 km/h or higher	**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: (NOAA)

Hail typically accompanies thunderstorms and is profiled separately.

Impact: The impact of strong winds in South Hero is considered *negligible to moderate* by the committee depending on wind type, strength, duration and local conditions. Typical damages include down trees and branches that disrupt electrical and telecommunication services and traffic flow. Roads are sometimes closed or reduced to one lane traffic as highway and fire department crews work to clear the roadways. Structural damage to homes and businesses typically comes in the form of damaged roofs (blow of tiles), broken windows from flying debris and personal property damages from upturned trees. Residences along the shore line experience increased wave action that can erode shorelines, set docks and moored boats adrift. In the winter, strong winds can freeze roads, create snow drifts on roads, and cause white outs. Wind chill causes temperatures to drop to dangerously cold levels.

There is power surge equipment and emergency backup generators installed for electronic equipment at the Fire Station, Highway Department, Town Office, and Folsom School buildings. The Highway and Fire Departments are equipped with associated debris removal equipment.

Vermont Electric Cooperative utility lines and infrastructure are in process of being reinforced due to damaging winds and are vulnerable to toppling trees. A right-of-way vegetation management plan is in place for the utility corridors to help mitigate damages. Strong wind events with associated power outages can have a short-term impact on the local economy due to business closures.

Town Vulnerability:

People: Strong Wind events can cause injuries or fatalities to people who do not shelter-in-place in time, or who do not have adequate shelter. Delayed sheltering-in-place can be caused by no-notice events, or by individuals who do not heed the warning. The elderly, the homeless, residents with special needs and those without proper transportation may potentially be impacted more than others.

Communication systems are vulnerable, as the loss of phone service poses challenges for residents—particularly vulnerable populations. With landline networks now relying on fiber lines that share poles with electrical service, phone access depends on short-lived battery backups during outages. Cell service is commonly used but often unreliable in certain areas, complicating efforts to reach emergency services.

Built environment: The primary threat to critical infrastructure, residential structures, and public safety across the town. Key vulnerabilities include public facilities—such as the Town Office, Fire Station, Rescue Building, Folsom School, and Town Highway Building—as well as commercial structures, seasonal homes, barns, livestock, marinas,

and local campgrounds (Apple Island Resort and Camp Skyland). Typical wind damage includes torn roofing, compromised siding, and broken windows. Above-ground utilities—including poles, transformers, and power lines—are highly susceptible, with widespread outages disrupting local businesses and public operations. Strong winds combined with wave action present severe erosion and tree-hazard risks along West Shore Road and East Shore Road. Additionally, lightning strikes—most prevalent along exposed lakeshore properties—risk causing structural fires, wildland fires, and major electrical equipment destruction. Note that South Hero contains no mobile home parks.

Natural environment: Wind events can cause damage to the environment with downed trees, and uprooted trees and plants. Wind driven waves can accelerate deterioration of lakeshore beaches and properties.

Economy: Structural damage and power outages force business closures and prevent local stores and restaurants from processing electronic transactions. Emergency road cleanup, damage repairs, employee overtime, and heavy equipment operation draw heavily on town resources. Severe home damage (damaged/destroyed roofs, broken windows in winter and siding) may temporarily displace residents and create short-term housing needs.

Severe winds can destroy crops, orchards, vineyards impacting local farm-and agricultural based businesses, and revenues.

Potential Future Impacts:

- **Climate Change:** Future impacts of wind events (windstorms, thunderstorms, tornado, tropical storms and hurricanes) are varied. According to NOAA, warming temperatures will cause a predicted increase in wind speeds through warmer atmospheric conditions that fuel stronger severe thunderstorms in the Champlain Valley. Higher overall temperatures and increased atmospheric moisture will heighten instability during summer and early fall, leading to localized microbursts, extreme straight-line winds, and elevated risks of severe convective storms.
- **Change in Lande Use/Development:** Although the town lacks high-risk structures like mobile home parks, the conversion of seasonal lakeshore properties into year-round homes and ongoing rural residential infill steadily increase structural exposure to extreme winds and wave-driven shoreline erosion. Future commercial and residential development within designated Village Core boundaries would help reduce the extension of vulnerable utility lines.
- **Change in Demographics:** South Hero's population demographics are not expected to change significantly in the next five years, though an increase in the average age of the population may increase vulnerabilities of the population.

History: See Appendix E for history of strong winds (windstorms, thunderstorms, tornados, tropical storms and hurricanes).

Invasive Species – *Moderate Risk*

Description: Invasive species are non-native plants, animals, or pathogens that spread rapidly in an ecosystem, causing harm to the environment, local economies, or public health. These species can outcompete native species, disrupt ecosystems, and cause significant ecological and economic damage. Invasive species can be plants, animals, fungi, or microorganisms. They often have high reproductive rates, few natural predators in their new environment, and the ability to thrive in a wide range of conditions.

Common invasive plants found in Grand Isle County and South Hero include Common buckthorn, glossy buckthorn, honeysuckle, Japanese knotweed, wild parsnip and garlic mustard.

The Champlain Islands' orchards and agricultural lands are susceptible to invasive insects such as Brown marmorated stink bug, spotted wing drosophila.

Forest and Terrestrial Invasive Species include emerald ash borer (widespread0, hemlock woolly adelgid (not yet widespread) and beech leaf disease (expected expansion into the Champlain Islands)

Aquatic Invasive Species include Eurasion milfoil, zebra mussels, and Spiny water flea.

While not an invasive species, South hero has experience recurring cyanobacteria (blue-green algae) blooms along portions of its Lake Champlain Shoreline particularly during warm summer months when nutrient runoff and calm weather promote bloom development.

Location: All ecosystems in South Hero are susceptible to invasive species from including forests, wetlands, agricultural lands, neighborhood backyards, waterways, are susceptible to invasion by non-native species.

In particular, Emarald Ash Borer is confirmed in South Hero. This invasive wood-boring beetle is a severe ecological threat. Ash trees make up an estimated 40% to 60% of Grand Isle County's forest canopy, and infestations are expected to decimate the local ash population. The South Hero Land Trust actively monitors local forests and runs replanting programs to mitigate the damage.

Wild parsnip is a toxic plant that grows widely throughout South Hero, taking over disturbed soils and posing a skin-contact hazard to people and animals due to its photosensitive sap.

Because South Hero is an island town on Lake Champlain, it is heavily impacted by aquatic invasive species. Local efforts, such as the *Keeler Bay Action Plan*, focus on managing:

- Eurasian Watermilfoil: An aggressive aquatic plant that forms dense underwater mats, crowding out native species and interfering with boating and swimming.
- Zebra Mussels: Tiny, destructive mollusks that blanket shorelines, clog water pipes, and alter the aquatic food web.
- Water Chestnut: A floating plant that creates nearly impenetrable mats on the water's surface, severely restricting light and oxygen in shallow bays.

Figure 14 Emerald Ash Borer, (ANR)



Probability: The probability of invasive species introduction and spread in South Hero is considered *highly likely* by the committee. The Town and Village's location near active agricultural lands, forests, and waterways increases the likelihood of exposure to new invasives. Climate change and increased human movement (e.g., transportation, trade, and recreation) further elevate the risk by creating more favorable conditions for species to establish and spread. Several invasive species are already present in the region, indicating a continued and persistent threat.

Extent: The extent of an invasive species hazard in South Hero can range from localized infestations (e.g., roadside patches of wild parsnip) to widespread ecological disruption (e.g., emerald ash borer infestation across forested areas). The severity of impact depends on the species involved, the size of the infestation, and how quickly it is detected and managed.

Infestations of Eurasian watermilfoil and zebra mussels interfere with boating, fishing, swimming, and shoreline infrastructure, increase maintenance costs for docks and water intake systems, and require ongoing management, monitoring, and public education to limit their spread.

Invasives can affect forest health, agricultural production, recreational access to the Lake and trails, and even public safety in the case of toxic plants. Invasive species may cause overgrowth or damage to various built environments, such as powerlines and culverts. The damage can be minor to catastrophic. Over time, the cumulative effects can lead to long-term ecological changes and economic losses.

Impact: The impact was ranked as *moderate* in South Hero according to the committee due to the type and locations of damage that occurred. According to Vermont Fish and Wildlife, garlic mustard, Japanese knotweed, buckthorn, barberry, honeysuckle, and others are common along woodland edges, trails, fence rows, and roadsides. The emerald ash borer quickly became widespread throughout the town and county.

Town Vulnerability:

People: Health and safety risks from toxic or harmful plants such as wild parsnip or giant hogweed include severe skin burns or rashes when touched, particularly during outdoor activities like mowing, hiking, or farming. Invasive insects, such as ticks, can increase the risk of vector-borne diseases like Lyme disease.

Built Environment: The emerald ash borer threatens ash trees near roads, utility lines, and buildings. Dead or weakened trees pose a risk of falling and damaging power lines, homes, or roads, increasing maintenance and emergency response costs. Invasive roots, such as those from Japanese knotweed, can damage foundations, pavement, and drainage systems. Invasives growing in stormwater systems such as tile drains or ditches can clog drainage pipes and culverts or block flow, worsening local flooding or erosion.

Natural Environment: Invasive plants like Japanese knotweed, honeysuckle, or wild parsnip can outcompete native vegetation, leading to the decline of native plants that local wildlife depends on for food and habitat. Forests are particularly at risk from pests like the emerald ash borer, which can cause widespread tree mortality, reduce forest canopy cover, and disrupt wildlife corridors.

Economy: Timber and forestry impacts from species like emerald ash borer can reduce income from woodlots and lead to costly tree removal near homes, roads and utility corridor. Landowners and farmers may face rising costs related to invasive species control, lost productivity, or degraded soil and pasture conditions. Long-term impacts may include reduced timber value, increased infrastructure maintenance costs, and diminished recreational and tourism opportunities.

Potential Future Impacts:

Climate Change: According to the Department of Health, deep cold spells can play a crucial role in controlling insect pests by limiting overwinter survival, reducing the number of generations, and slowing the spread of invasive species and insect-borne plant diseases. A decline in extreme cold due to climate change may lead to increased pest resistance, greater risks to agriculture and forests, and a wider spread of harmful species like ticks with Lyme disease, which are typically limited by colder climates. As northern and high-elevation areas of Vermont warm, they may become more suitable habitats for ticks and their hosts, such as mice. Reduced snowpack from warming winters could still expose these hosts to freezing during sudden cold snaps.

Warmer spring and fall temperatures prolong the growing season. Invasive plants like Eurasian watermilfoil and water chestnut can start growing earlier in the spring, allowing them to shade out and outcompete native plants before they have a chance to establish. Heavy rain events wash high concentrations of sediment and nutrients (such as phosphorus) from the landscape into the lake. This surge in nutrients, combined with warmer waters,

creates ideal "super-charged" conditions for dense, invasive weed mats and harmful cyanobacteria (blue-green algae) blooms.

Change in Land Use/Development: Increased urbanization, agriculture, or deforestation can disturb native ecosystems, making them more vulnerable to invasive species. Development often creates fragmented landscapes and edge habitats that favor fast-growing, opportunistic invaders over native species. Additionally, increased human activity and infrastructure (e.g., roads, landscaping, water management) can unintentionally introduce and spread invasive species into new areas. Increased development along the lake shore could create erosion of shorelines that lead to silt and phosphorous runoff that could lead to "mud flats" where millfoil aggressively outcompetes native plants.

Change in Demographics: As South Hero's population grows as new people move to town, land clearing for housing and infrastructure can disturb native habitats, making it easier for invasive plants like Japanese knotweed or wild parsnip to establish. Landscaping with non-native ornamental plants may inadvertently introduce invasive species that spread into natural areas.

History: Eurasian watermilfoil has been documented in portions of Lake Champlain since the 1960s and is established around the Champlain Islands. Dense growth interferes with boating, swimming, and native aquatic habitat.

Zebra mussels were established in Lake Champlain in the early 1990s and are widespread around South Hero. They clog water intake systems, alter aquatic ecosystems, and damage boats and docks.

Spiny water flea was first detected in Lake Champlain in 2014. This invasive zooplankton competes with native species and can affect the lake's food web and sport fisheries.

South Hero has experienced recurring cyanobacteria (blue-green algae) blooms along portions of its Lake Champlain shoreline, particularly during warm summer months when nutrient runoff and calm weather promote bloom development.

Emerald ash borer (EAB) was first detected in Vermont in 2018 and has since spread throughout much of the state. Ash trees in South Hero are at risk of widespread mortality, increasing hazards from falling trees along roads, trails, and utility corridors.

Hemlock Woolly Adelgid has expanded northward in Vermont in recent years. While not yet widespread in South Hero, continued warming temperatures increase the likelihood of establishment and impacts to eastern hemlock stands.

Beech leaf disease has been identified in Vermont and poses a growing threat to American beech forests, with expected expansion into the Champlain Islands.

Hazardous Materials – *Moderate Risk*

Description: Hazardous materials are defined as chemical, biological, radiological, nuclear, or physical substances that—due to their quantity, concentration, or toxic, flammable, reactive, or corrosive properties—pose a significant risk to human health, safety, property, or the environment during manufacture, storage, transportation, or disposal. When evaluated as a natural or technological hazard, a hazardous materials event typically involves the accidental release, spill, leak, or explosion of these substances.

Key aspects of this hazard include:

Fixed-Site: Facilities that manufacture, use, or store toxic chemicals, fuels, agricultural fertilizers, or industrial solvents (e.g., water treatment plants, gas stations, manufacturing facilities).
Transportation: Vulnerabilities along transit corridors—such as major highways, railways, pipelines, and navigable waterways—where hazardous materials are actively moved via tanker trucks, freight cars, or pipes.
Environmental & Health Impacts: Releases can contaminate local air, soil, or water supplies, causing immediate acute risks (such as chemical burns, respiratory emergency, or explosion hazards) and long-term ecological damage.
Secondary Hazard Triggers: Hazardous material incidents can occur independently (technological hazards) or as secondary impacts triggered by natural disasters, such as severe winds, earthquakes, or flooding damaging storage containers or severing power lines.

Location: There are 8 sites in Town that have sufficient types and/or quantities of hazardous materials that require reporting through 20 VSAP, Chapter 1 and Public Law 99-499, 42 USC 9601 "Superfund Amendments and Reauthorization Act of 1986, Title III Emergency Planning and Community Right to Know."

There are no large fixed-site storage facilities in town other than for gasoline, kerosene, diesel fuel in underground storage tanks at gas stations. There are above ground storage tanks for diesel and oil at the town garage. Propane filling stations at Island Beverage, and AmeriGas Propane Exchange at Keeler's Bay Variety. Incidents at those locations are unlikely due to state safety inspections and regulations.

The following table lists permitted underground storage tanks as reported to the Vermont Agency of Natural Resources. These tanks have not been taken out of service.

Table 8: Underground Storage Tanks in South Hero

Facility Name	Location	Gallons	Contents
Chippen Point Trust	W Shore Road	2,000	Fuel Oil #2 or #4
Residence	125 Kibbee Point Road	2,000	Fuel Oil #2 or #4
Folsom Education and Community Center	75 South Street	2,000	Fuel Oil #2 or #4
Keeler's Bay Variety	500 Route 2	4,000 (5 tanks)	Gasoline
Residential	South Street	2,000	Fuel Oil #2 or #4
Saint Rose of Lima Church	501 US Route 2	1,000	Fuel Oil #2 or #4
Simon's Island Beverage	1 Ferry Road	4,000 11,000 4,000	Diesel Gasoline Gasoline
Stewert's Shops	337 US Route 2	12,000 1,000 5,000 7,000	Gasoline Fuel Oil #4 or #4 Gasoline Diesel

The frequent movement of hazardous materials, especially propane and fuel oil along US Route 2 increases the risk of transportation-related incidents. Key infrastructure and access routes, including the US Route 2 Causeway, village area and the school zone could be severely disrupted, with potential evacuation or shelter-in-place orders needed. Limited local response capacity further heightens the town's vulnerability to extensive service disruption, property damage, and public safety impacts

Probability: The committee determined the probability of a hazmat incident as *occasional* given the limited history of accidents and spills.

Extent: An incident could result in localized damage, particularly from the transport, storage, or accidental release of flammable or combustible liquids such as heating and automotive fuels. There are no industries that store large volumes of hazardous materials or medical waste in South Hero. Radiological and nuclear incidents, considered extremely rare, would be the result of an accident during the transport of materials through town. There are no nuclear power plants in Vermont.

Major incidents on US Route 2 and related causeway could disrupt traffic, essential services and transport of goods until corrective action has been completed. Route 2 was identified as the most probable location of a major incident. Residences, commercial and public facilities along the route could be impacted with the worst impact being having to drive north 26 miles along US Route 2 to Alburgh to get off Island, then an additional 11 miles east to Swanton get to Interstate 89 or 5 miles west to Rouses Pont in New York State.

South Hero Volunteer Fire Department members have received HazMat awareness and technical training. The Vermont HazMat response team would assist in responding to a HazMat incident. The nearest HazMat response trailers and equipment are stationed 5 miles north in the town of Grand Isle and 6 miles east in town of Colchester.

Impact: The impact of a hazardous materials incident would be *limited* at the site of a spill, accident or release. The recommended evacuation / shelter in place distance is 1,500' from the source of spill, accident or release (weather dependent).

A hazmat transport incident on US Route 2 within the village could impact town office, fire station, residences and businesses who may have to shelter in place until the spill is mitigated safely. East Shore Road and Landon Road could be used village bypass routes. Station Road, Lake View Road and West Shore Road could be used as a village bypass for northbound traffic.

Town Vulnerability:

People: Hazardous materials incidents can cause serious injuries, illness, long-term health effects, or fatalities, depending on the type and magnitude of the release. Such events may also require evacuation, shelter-in-place orders, and extensive public health response efforts.

Built environment: Such incidents can contaminate buildings, transportation infrastructure, water supplies, and critical facilities, potentially rendering them unusable until decontamination is completed. Response and recovery operations may require facility closures, specialized cleanup, and long-term monitoring. Incidents occurring on US Route 2 could disrupt traffic and essential services until corrective action has been completed. This corridor was identified as the most probable location of a major incident. Residences, commercial, and public facilities along the state routes could be impacted but the impact would be limited to the immediate area. At-risk sites include the South Hero Fire and Rescue stations, the Town Office, the public works building, the library, and Bayview Crossing, a 30 unit, older adult, mixed income apartment building could be impacted by an incident on Route 2 in the village.

Natural environment: Hazardous substances released during a hazardous materials incident can contaminate soil, groundwater, surface waters, vegetation and wildlife habitats, causing both immediate and long-term environmental impacts. The severity of environmental damage depends on the type of materials released, exposure pathways, and during of contamination. The Vermont Agency of Natural Resources is responsible for ensuring remediation plans are in place for comminated areas.

Economy: Hazardous materials incidents can generate significant costs associated with emergency response, evacuation, decontamination, healthcare, environmental remediation and infrastructure restoration. Long-term economic impacts may include business interruptions, reduced property values, loss of public confidence, and ongoing monitoring and recovery expenses.

Potential Future Impacts:

Climate Change: Climate change is not expected to directly increase the impact of a hazardous materials incident in South Hero; however, it may increase the severity of impacts from such events. Increased flooding or extreme weather could exacerbate the spread of hazardous materials during an incident, especially near waterways, farms, or storage facilities. Warming temperatures may increase the volatility or persistence of certain chemicals or biological agents in the environment. Stressed ecosystems may have less resilience to recover from contamination.

Change in Land Use/Development: This may increase the number of people, structures, and critical facilities located near transportation corridors, utility infrastructure, or facilities that store, use, or transport hazardous materials. There are no planned commercial or industrial development in the community. Any increase in housing developments will increase the risk of hazardous materials incidents involving home heating fuels.

Change in Demographics: The potential impacts of a hazardous materials incident increases with a growing population by increasing the number of people exposed to a hazardous release and create greater demands on emergency response resources. Growth in vulnerable populations, including older adults, children, individuals with disabilities, and those with limited access to transportation, may further increase the challenges associated with protecting public health and safety during an incident.

History: There have been no major hazardous materials incidents recorded in South Hero. The only incidents on record for South Hero consist of routine, low-level environmental issues typical of rural Vermont, such as localized home heating oil tank leaks, gas station spills, motor vehicle accidents and agricultural runoff.

Extreme Cold – *Moderate Risk*

Description: In South Hero, the summers are comfortable, wet, and mostly sunny and the winters are freezing, snowy, and mostly cloudy. Over the course of the year, the temperature typically varies from 7°F to 76°F and is rarely below -11°F or above 83°F.

Extreme cold events commonly occur during the winter months and may be intensified by wind chill, which increases the rate of heat loss from the human body and can lead to frostbite or hypothermia within minutes.

Table 9: Average Monthly Temperatures in South Hero

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	27°F	31°F	40°F	54°F	67°F	76°F	80°F	79°F	71°F	57°F	45°F	33°F
Low	10°F	13°F	22°F	35°F	46°F	56°F	61°F	60°F	52°F	51°F	32°F	20°F

Location: All areas in South Hero are susceptible to cold events.

Probability: The committee determined the probability of an extremely cold event to be *highly likely* but duration varies from less than 12 hours to several days.

Extent: The National Weather Service typically defines extreme cold conditions through wind chill advisories and warnings. In the context of hazard mitigation, extreme cold is considered a recurring natural hazard with the potential

for widespread impacts.

- **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.

The extent of extreme cold in can be severe, with temperatures often dropping well below freezing and sometimes

Figure 15: Wind Chill Temperature Index

Wind (mph)	Temperature (°F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-58	-63
10	34	27	21	15	11	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-38	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-83	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-52	-60	-67	-74	-81	-88	-95
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
Frostbite times	None		>2 hours				≤30 minutes		≤10 minutes		≤5 minutes							

reaching as low as -20°F to -30°F during winter months. This extreme cold, coupled with wind chills that can plunge even lower, poses significant risks to public health and infrastructure. The frigid temperatures can cause hypothermia and frostbite within minutes for exposed individuals, particularly affecting vulnerable populations such as the elderly, low-income residents, and those without proper heating or shelter.

Prolonged periods of extreme cold can impact public health and safety, transportation infrastructure, public utilities, water infrastructure, power and heating systems, agriculture, and the local economy. Extended periods of extreme cold increase the risk of hypothermia, frostbite, and other cold-related illnesses, particularly among vulnerable populations such as older adults, young children, and those without adequate heating. Cold weather can also cause water pipes to freeze and burst, fire hydrants to freeze impairing a response to structure fires. It can strain heating and electrical systems and increase the likelihood of power outages. Transportation may be disrupted by icy roads and vehicle failures. There are also higher costs for heating and maintenance. These impacts can affect the entire community and become more severe when extreme cold occurs for an extended period or coincides with other winter weather events.

Impact: The impacts of extreme cold in South Hero were determined by the committee to be *minor to major*.

South Hero sits in a northern location and inland setting making it prone to Arctic air masses, which regularly bring extreme cold. According to NOAA, extreme cold temperatures are a recurring winter hazard in northern Vermont. The region typically experiences multiple periods of subzero temperatures each winter.

Extreme cold temperatures in South Hero typically cause frozen water lines for both public and private water lines affecting residences, businesses and public buildings. Vehicles with older batteries and engines may have difficulty starting which would affect people's ability to drive to work, school or attend health care appointments. On occasion, extremely cold temperatures cause power disruptions in South Hero due to increased electrical load from space heater. Heat pumps often fail during extremely cold weather spells due to their design. Occasionally, schools will close.

Town Vulnerability:

People: Extreme cold can cause hypothermia, frostbite, and other cold-related illnesses, particularly among people with disabilities and functional access needs such as older adults, young children, the unhoused and those without adequate heating.

Built Environment: Prolonged cold temperatures can damage buildings, freeze water and sewer lines, increase energy demand, and strain utility infrastructure. It also complicates construction and infrastructure projects, as frozen ground makes it difficult to dig or lay foundations, repair utilities, or manage drainage systems. Frozen soil can lead to frost heaves, where the expansion and contraction of frozen ground causes damage to road infrastructure, driveways, and foundations. It can lead to frozen water mains, and frozen water lines. Water and heating systems are vulnerable to freezing during subzero events, especially in older home s or uninsulated areas. The cold also puts a strain on the local energy grid due to the increased demand for heating.

Natural Environment: Extreme cold can stress wildlife, alter ecosystem processes, and affect the health and survival of sensitive plant and animal species.

Economy: Extreme cold can increase heating and maintenance costs, disrupt transportation and outdoor work, reduce productivity, and create financial burdens for households, businesses, and municipal services.

Potential Future Impacts

Potential Future Impacts:

Climate Change: Although extreme cold events may occur less frequently and with shorter duration, they are likely to become more unpredictable due to changes in the jet stream influenced by Arctic warming. As winters warm, more frequent freeze-thaw cycles are expected, with temperatures regularly rising above and falling below freezing. These cycles can significantly impact transportation infrastructure, causing potholes, frost heaves, and damage to roads, bridges, and building foundations. Additionally, extreme temperature fluctuations during winter months can create unstable river ice conditions causing ice jams and localized flooding. Warming temperatures and reduced extreme cold may increase pest survival and expand habitats for disease-carrying species like ticks, posing greater risks to agriculture, forests, and public health.

Change in Land Use/Development: As extreme cold events become less frequent, future land use and development may shift to accommodate longer growing seasons and reduced heating demands. However, sudden cold snaps could still pose risks to infrastructure, agriculture, and natural systems unaccustomed to variable winter conditions. Development plans may need to account for these fluctuations by incorporating resilient building designs and land management practices.

Changes in Demographics: South Hero's population is expected to continue to grow over the next five years. Population growth can place additional demands on heating systems, electrical infrastructure, emergency services, and public shelters during prolonged cold periods. Increased development may also expand the amount of infrastructure vulnerable to frozen pipes, utility disruptions, and transportation challenges. Vulnerable populations, including older adults, young children, and lower-income households, may require additional assistance during extreme cold events. As a result, future population growth could increase both the number of

people affected and the resources needed to prepare for, respond to, and recover from extreme cold conditions.

History: Please refer to Appendix E for history of extreme cold temperatures.

Extreme Heat – *Moderate Risk*

Description: Extreme heat refers to prolonged periods of excessively hot weather, often accompanied by high humidity which can pose serious health, safety and infrastructure risk. In South Hero, extreme heat typically occurs during the summer months when daytime temperatures rise well above average—often exceeding 90°F (32°C)—and nighttime temperatures remain elevated, preventing cooling.

Location: All areas of South Hero are susceptible to extreme heat events.

Probability: The probability of extreme heat in South Hero is considered *likely* by the committee. While historically rare in northern Vermont, climate change is contributing to more frequent and intense heat waves in the region. The number of days with temperatures exceeding 90°F (32°C) is projected to rise over the coming decades. These events are becoming more common during the summer months, particularly in July and August, and may also begin occurring earlier and later in the season.

Extent: The severity of these events can vary based on humidity levels, wind conditions, and the persistence of high-pressure systems. During more intense heat waves, the heat index—a measure that combines temperature and humidity—can reach dangerous levels, significantly increasing health risks, stressing energy and public health systems.

Agricultural impacts may include crop damage, heat stress in livestock and reduced productivity. Additionally, local events and outdoor activities may be canceled or scaled back, and economic losses may occur in sectors like farming, recreation, and tourism.

Heat advisories, watches, and warnings are issued by the National Weather Service and local authorities to alert residents to the risks of impending heatwaves. Places with limited tree cover and ventilation may experience more intense local effects, known as the urban heat island effect, though this is less pronounced in rural communities like. South Hero.

The Vermont Department of Health's Heat Vulnerability Index (HVI) references South Hero. The Town's Heat Illness Vulnerability is below the state's mean level (-0.5 to -1.5) roughly averaging 3 to 6 days per year days per year with maximum temperatures of at least 87°F.

Impact: The impact of extreme heat in South Hero was determined by the committee to be *minor* to *moderate*. Extreme heat in South Hero typically lasts for one to several days and up to a week, with daytime temperatures exceeding 90°F and limited overnight cooling. Because South Hero is located on an island in Lake Champlain with cool summer water that buffers summer temperatures.

Prolonged high temperatures lead to heat-related illnesses such as heat exhaustion and heat stroke, especially among at-risk populations. First response agencies may see increased demand, and public safety services may be strained. Extreme heat can also cause infrastructure stress, including power outages (brown outs) due to high energy demand for cooling systems.

Town Vulnerability:

People: Heat events can cause injuries or fatalities to people who do not heed heat advisories. People with disabilities or functional access needs may be more susceptible to heat related illnesses or injuries such as heat stroke. Older adults have a reduced physiological ability to regulate body temperature, while infants and children rely entirely on caregivers and dehydrate faster. First response services (fire, rescue, law enforcement) could be impacted with larger crowds being drawn to the town beaches and marinas and increased recreational boaters, cyclists and tourists.

Built Environment: Heat events can cause a strain on the town's electrical system, leading to brown or blackout events. Extreme heat can also cause thermal expansion of concrete and steel and swelling on connection bridges.

Natural Environment: Heat events can increase the occurrences of droughts and wildfires. Droughts can cause minor to catastrophic issues for the natural environment. Local wild plants and crops may be lost during a prolonged drought event. Additionally, a drought can lead to streams and groundwater being depleted, which impacts wild and domesticated animals.

Economy: Heat events can cause economic impacts to the towns' operations. Impacts include disruption or closure of municipal departments as well as private businesses from staff with heat related illnesses or power disruptions. It may actually help the local economy as more in-state and out of state tourists are drawn to the town's beaches and marinas.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase extreme heat occurrences in South Hero and New England. South Hero has the added benefit of being an island on Lake Champlain which helps with cooling days where temperatures climb above 90 degrees or more. Older adults are physiologically more sensitive to heat stress, cardiovascular strain, and dehydration. Many older homes on the island lack central air conditioning. High heat days drive up local electricity demand for cooling, putting strain on regional rural power grids. South Hero's economy relies heavily on commercial apple orchards, berry farms, vineyards, and field crop agriculture. Outdoor farmworkers face severe heat stress during critical summer harvest and maintenance months. Agricultural crops, vineyards and orchards productivity could be impacted by warmer winters and hotter summers. There is increased likelihood of future drought events, both in frequency and magnitude.

Change in Land Use/Development: No changes to asset impacts due to extreme heat and drought events as a result of development or land use changes could be identified.

Change in Demographics: South Hero's population demographics are not expected to change significantly in the next five years, though an increase in the average age of the population may increase vulnerabilities of the population.

History: Refer to Appendix E for history of extreme heat events in South Hero.

Infectious Disease Outbreak – *Low Risk*

Description: An infectious disease outbreak is the occurrence of cases of a disease caused by bacteria, viruses, parasites, or fungi that exceed normal expectations within a specific area or population. These outbreaks can spread quickly and unpredictably, posing significant threats to public health, healthcare systems, and local economies

Location: An infectious disease outbreak can affect the entire geographic area of South Hero, including residential neighborhoods, Folsom School, Champlain Islands Community Health Centers, first response agencies, town offices, departmental staff, and workplaces. Due to the Town's small size and interconnected nature, diseases can spread rapidly through person-to-person contact in shared spaces such as the Town center, grocery stores, and community events. Regional travel, commuting patterns, and school attendance can also contribute to the introduction and transmission of

disease from surrounding towns and counties.

Probability: The probability of future infectious disease outbreaks in South Hero is considered *occasionally* by the committee.

Extent: Seasonal illnesses like influenza and tick-borne diseases such as Lyme disease are regularly reported according to Champlain Islands Community Health Center. The risk of larger outbreaks—such as COVID-19 or other emerging infectious diseases—remains elevated due to factors like proximity to Canada, travel, climate change, and population movement. Public health trends and past events suggest that the community will continue to face infectious disease threats in the foreseeable future.

Outbreaks may persist from a few days to several years, depending on factors such as the type of pathogen, the effectiveness of the public health response, and the level of immunity within the population. Certain diseases also follow seasonal trends, such as influenza peaking in winter and vector-borne illnesses becoming more prevalent in warmer months.

People with disabilities and those with access and functional needs may be especially vulnerable during a disease outbreak, although anyone can be affected. Outbreaks can strain local healthcare facilities, sometimes requiring temporary modifications to public spaces, such as converting schools into triage centers. The natural environment may also play a role in the origin or spread of disease, necessitating measures like water treatment to prevent further transmission. Economically, outbreaks can disrupt or shut down businesses and lead to additional costs for public health responses, such as running immunization clinics.

Impact: The committee categorized the impact as *negligible to moderate*. Typical outbreaks are limited to individual or family cases or within group settings such as Folsom School, Bayview Crossing apartments or commercial offices. A larger outbreak has the potential to be widespread and disruptive. Public health may be significantly affected as occurred during the Covid-19 outbreak, especially among vulnerable populations like seniors, children, and individuals with preexisting conditions.

Local and regional healthcare facilities and services may become overwhelmed, and essential services such as education, first response, and municipal operations may be interrupted. Prolonged outbreaks or pandemics can result in business closures, economic losses, mental health challenges, and long-term community strain. Quarantine measures, supply chain disruptions, and public health mandates may further impact daily life.

Town Vulnerability:

People: Infectious disease outbreaks can result in illness, hospitalization, and death, particularly among people with disabilities and functional access needs such as older adults, young children, and individuals with underlying health conditions. Widespread outbreaks can also affect mental health and disrupt daily activities, education, and access to essential services. Champlain Islands Community Health Center could be overwhelmed with cases. Bayview Crossing older adult apartments could be at risk of an outbreak within the complex.

Built Environment: Infectious diseases can disrupt the operation of schools, municipal facilities (town office, public works department, water treatment plant), and critical infrastructure by reducing workforce availability and increasing demands on public services. Public buildings (town offices, schools, library, post office) may require enhanced sanitation measures, temporary closures, or operational modifications to reduce disease transmission.

Natural Environment: Infectious diseases generally have limited direct impacts on the natural environment, but increased use of medical supplies, disinfectants, and waste disposal can create localized environmental pressures. Some diseases may also affect wildlife populations.

Economy: Disease outbreaks can lead to workforce shortages, reduced business activity, increased healthcare costs, and disruptions to local commerce and tourism. Long-term economic impacts may include lost productivity, increased public expenditures, and financial strain on households, businesses, and municipal governments.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase the frequency and intensity of disease outbreak events through various mechanisms. Temperature changes may increase vector-borne disease and pathogen survival. Extreme weather events (e.g., tropical storms, flooding, winds) can disrupt infrastructure, leading to breakdowns in sanitation, clean water supply, and healthcare services. Climate-induced displacement and migration can lead to overcrowded living conditions, which can facilitate the spread of infectious diseases.

Changes in Land Use/Development: A widespread infectious disease outbreak could cause disruption in available trades people, construction workers and laborers available to work on housing, transportation and utility infrastructure projects. No large-scale projects are anticipated in South Hero in the near future.

Changes in Demographics: South Hero's population growth may increase opportunities for disease transmission through greater interaction in schools, workplaces, public facilities, and community events. An aging population may be more susceptible to severe illness and may place greater demands on healthcare and support services during an outbreak. Additionally, vulnerable populations, including individuals with underlying health conditions, limited access to healthcare, or economic constraints, may face greater challenges in preventing infection and recovering from illness, potentially increasing the overall impact on the community.

History: Per the Vermont State Hazard Mitigation Plan:

- 1918, 1957, 1968: Pandemic Influenza.
- 2009: H1N1 strain.
- 2015: Sika virus.
- 2020 - 2021: COVID-19.

Drought – *Low Risk*

Description: Drought is a prolonged period of abnormally dry weather characterized by a deficiency in precipitation, resulting in water scarcity and environmental stress. Droughts can have significant impacts on agriculture, water resources, ecosystems, and socio-economic systems. Droughts manifest gradually and can vary in duration, intensity, and spatial extent. They may be triggered by natural climate variability, such as atmospheric circulation patterns, or exacerbated by human activities, such as land use changes and water management practices

Location: All areas if South Hero are susceptible to drought.

Probability: The probability of extreme drought in South Hero is considered *likely* by the committee.

Extent: Droughts can affect large geographic regions, including urban and rural areas, agricultural lands, forests, and waterways. Drought severity is often categorized based on indicators such as precipitation deficits, soil moisture levels, streamflow, and water storage reservoir levels. Severe droughts can lead to significant water shortages, ecological disturbances, and socio-economic impacts. Severe droughts can result in reduced water availability for drinking, bathing, irrigation, and commercial uses, leading to economic losses, environmental degradation to streams habitats, wetlands, and forests and social disruption as restaurants, bars and cafes may be forced to limit operational hours.

Impact: South Hero's extensive commercial orchards (e.g., along Lake Road, Route 2, and South Street) feature perennial crops with high summer water requirements. Without sufficient rainfall or dedicated irrigation ponds, these soils dry rapidly during peak summer transpiration, threatening fruit yield and tree survival.

Residents and commercial properties that rely on wells and spring fed systems would be impacted by drought.

Shallow, sheltered bays around the southern and eastern shorelines of the island are vulnerable to the *secondary* impacts of hydrological drought. Low precipitation paired with warm temperatures drops water levels and slows water circulation, triggering intense cyanobacteria (blue-green algae) blooms that restrict water recreation and affect shorefront water intake lines.

Additionally, local events and outdoor activities may be canceled or scaled back, and economic losses may occur in sectors like agriculture, recreation, and tourism.

Town Vulnerability:

People: Much of South Hero relies on private wells or springs. Extended dry periods lower groundwater tables, leading to reduced well yields, loss of water pressure, or wells running completely dry. South Hero has a higher percentage of elderly residents than the state average, who are more susceptible to heat stress and water supply disruptions during drought conditions.

Built Environment: Private wells may need to be drilled deeper as water tables drop which is costly. Marina's may become too shallow for boats to dock. Overall, the vulnerability on the built environment for South Hero remains relatively low.

Natural Environment: Low precipitation combined lowers stream flows into Lake Champlain. Stagnant, warmer water in shallow bays can exacerbate seasonal cyanobacteria (blue-green algae) blooms, restricting recreational water use and private shorefront pumping.

Economy: South Hero is home to prominent commercial orchards, vineyards, berry farms, and livestock pastures. Drought during critical growing months (June–August) severely impacts crop yields, fruit size, forage growth, and requires increased irrigation or hauling water.

Potential Future Impacts:

Climate Change: Drought is projected to become longer, more frequent and more severe. Much of South Hero relies on private wells. Prolonged dry spells lower groundwater tables causing water pressure to drop, sediment in drinking water or wells simply running dry. This creates a financial burden on residents who would need to dig new wells. Climate change threatens the agriculture economy and adds financial strains on farm families. Prolonged drought also increases wildfire risk which would place added burden on South Hero's volunteer fire department's ability to respond to multiple incidents.

Change in Land Use/Development: No changes to asset impacts due to drought events as a result of development or land use changes could be identified.

Change in Demographics: Such changes could increase South Hero's vulnerability to drought. An aging population may have greater health risks during periods of water shortages, while seasonal residents and summer visitors can significantly increase water demand during the driest months of the year. Given there are no large developments planned in town in the near future, the impacts of drought on South Hero's future demographics are expected to be minimal.

History: Per the Vermont State Hazard Mitigation Plan:
"The droughts in the mid-1960s were the most severe in Vermont. Every county in the State experienced Exceptional Drought (D4) conditions in May of 1965. Since the 1960s Vermont has experienced several less severe periods of drought. There were two declared statewide droughts in June and July 1995. The drought persisted through the summer of 1995, and a third, more severe drought affected Southern Vermont in August of that year. In 2001-2002, Vermont was affected by a Severe Drought (D2), which peaked at over 14% of the State at the D2 level between November and December of 2001 and nearly 100% of the State in at least Moderate Drought (D1). Portions of Vermont were in Severe Drought (D2) from October 2016 through April 2017, peaking at 29.15% of Vermont in October and November 2016 and 80% of the State was in at least Moderate Drought (D1) (Figure 50). Moderate Drought conditions returned in October of 2017 and again in June 2018. 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."

Hail – *Low Risk*

Description: Hail is a form of precipitation composed of spherical lumps of ice. Known as hailstones, these ice balls typically range from 50 mm in diameter on average, with much larger hailstones forming in severe thunderstorms. The size of hailstones is a direct function of the severity and size of the thunderstorm that produces it.

Location: Hailstorms are random in nature and can impact any area or structure within the town.

Probability: The committee classified the probability of hail event as *unlikely.* There have been 15 recorded hail events in Grand Isle County between 1980 and 2024.

Extent: Hailstorms typically accompany thunderstorms between June and September. They are relatively infrequent, brief in duration, highly localized, and typically cause limited damage due to the generally small hail size—less than 1 inch in most cases. However, when larger hail does occur, it can result in significant damage to crops, property, and structures. One hailstorm in July 2010 caused widespread damages to apple orchards and crops in South Hero. The extent of damage is difficult to predict and quantify, as hailstorms are random in nature and can impact any area or structure within the town.

For TORRO Scale (hailstorm intensity), please refer to the State Hazard Mitigation Plan.

Figure 16: Tornado and Storm Research Organization Hailstorm Intensity Scale

TORRO Scale	Intensity Category	Typical Hail Diameter (mm.)	Probable Kinectic Energy, J-m^2	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-15	>20	Slight general damage to plants, crops
H2	Significant	10-20	>100	Significant damage to fruit and crops, damage to glass and plastic structures, pain and wood scored
H3	Severe	20-30	>300	Widespread glass damage, vehicle bodywork damage

H4	Severe	25-40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	-	Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75	-	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	-	Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	-	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	-	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Impact: The committee rated the impact of hail as *negligible*. Hailstones can damage crops, orchards, vineyards, vehicles, roofs, and siding. Typically, hail is small and rarely damages crops such as corn and hay to the level of causing financial losses for farmers. There are no reports of injuries from hail.

Town Vulnerability:

People: Hailstorms can cause injuries from falling ice, particularly to individuals outdoors, and may create hazardous travel conditions that increase the risk of vehicle accidents. Severe hail events can also disrupt daily activities and emergency response operations.

Built Environment: Hail can damage roofs, siding, windows, vehicles, agricultural structures, and other exposed infrastructure, resulting in costly repairs and maintenance. Critical facilities and utility systems may also experience localized damage during severe storms.

Natural Environment: Hail can damage crops, gardens, forests, and other vegetation by stripping leaves, breaking branches, and reducing plant productivity. Repeated or severe hail events can negatively affect agricultural yields and ecosystem health.

Economy: Hailstorms can lead to substantial economic losses through property damage, vehicle repairs, crop losses, insurance claims, and business interruptions. Recovery and repair costs can place financial burdens on property owners, agricultural producers, and local governments.

Potential Future Impacts:

Climate Change: Climate change can influence hailstorms in complex ways. Warmer temperatures increase atmospheric moisture and energy, which can lead to more intense thunderstorms—potentially making hailstorms more severe. However, higher temperatures near the surface may also melt smaller hailstones before they reach the ground, possibly reducing the frequency of smaller hail events.

Changes in Land Use/Development: Increased residential development in rural areas and farmland conversion could heighten vulnerability to hail-related damages.

Changes in Demographics: South Hero's population will continue to grow in the next five years, which will mean a greater number of homes, vehicles, businesses, and public facilities will be exposed to

damage. Such growth could mean greater economic losses and increased demand for first response services from severe hailstorms.

History: Refer to Appendix E for history of hail events in South Hero.

Earthquake – *Low Risk*

Description: An earthquake is the shaking of the surface of the Earth resulting from a sudden release of energy in the Earth's lithosphere that creates seismic waves.

Location: While earthquakes occur on fault lines, the entire town of South Hero is susceptible to an earthquake.

Probability: The committee considered Earthquakes as an *unlikely* event for the town and region based on history.

Extent: An earthquake is measured by magnitude, energy released by an earthquake, and intensity, effect and damage caused by the earthquake. The most commonly used scale is the Richter Scale. Although difficult to predict, given the State's historical earthquake data, South Hero may anticipate an earthquake measuring very low on the Richter Scale.

All of Vermont is classified as an area with a low to moderate seismic activity. This can be compared to the west coast of the U.S., which is classified as "very high" and the north-central states classified as "very low." Earthquakes have been felt in South Hero and remain a geologic possibility.

Impact: The committee rated the impact of an earthquake as *negligible* to *major.* Earthquakes can vary in size and intensity, and they may cause ground shaking, surface rupture, and secondary effects like landslides, tsunamis, or structural damage. Historically, earth quakes cause very slight almost undiscernible ground tremors.

Town Vulnerability: Earthquakes in Vermont are typically small tremors so the possibility of a threat to the following is low.

People: Earthquakes can cause injuries or fatalities from collapsing structures, falling objects, and secondary hazards, while also disrupting access to emergency services, healthcare, and essential resources.

Built Environment: Ground shaking can damage buildings, roads (US Route 2 and causeway), bridges, utilities, and critical facilities, resulting in structural failures, service interruptions, and costly repairs.

Natural Environment: Earthquakes can trigger secondary hazards such as altered stream channels, increased erosion, and cause bank failures. In South Hero, this could impact lakeshore properties that are located well above the mean water level. Additionally, groundwater systems could be affected, leading to changes in private and public water supplies.

Economy: Earthquakes can generate significant economic losses through property damage, infrastructure repairs, business disruptions, emergency response costs, and long-term recovery efforts.

Potential Future Impacts:

Climate Change: Climate change primarily affects atmospheric and oceanic processes, but there is emerging evidence suggesting that it can indirectly influence seismic activity, including earthquakes[6]. It is not currently possible to predict when or where an earthquake may occur.

Changes in Land Use/Development: No large residential or commercial developments are expected to occur in next 5 years. Any increase in the number of residential homes, residential and commercial developments and infrastructure would cause greater potential for property damage, service disruptions, and economic losses if an earthquake were to occur.

Changes in Demographics: South Hero's population demographics are expected to increase some in the next five years which could increase the potential impacts of an earthquake due to a greater number of residents, homes, businesses, exposed to ground shaking and related hazards. Population growth may also increase demands on emergency response, healthcare services, and recovery resources potentially resulting in greater economic losses and disruption to community services following an earthquake.

History: According to the VT Geologic Survey, the two strongest recorded quakes measured in Vermont were of a magnitude 4.1 on the Richter scale. One was centered in Swanton and occurred in 1943, and the second occurred in 1962 at Middlebury. The Swanton quake caused little damage, but the Middlebury quake did result in broken windows, cracked masonry and falling objects around the Middlebury area.

Earthquakes centered outside of the state have also affected Vermont. Two quakes of magnitude 5.5 occurred in New Hampshire in 1940. In 1988, an earthquake with a magnitude 6.2 was centered in Saguenay, Quebec and caused shaking in the northern two thirds of Vermont. On June 23, 2010, a magnitude 5.2 earthquake in Ottawa was felt in the area. No damage was reported.

Wildfire – *Low Risk*

Description: Wildfire is an uncontrolled fire that burns in forests, grasslands, brush, or other natural areas, often fueled by dry vegetation, wind, and weather conditions. Wildfires can spread rapidly and pose serious threats to public safety, property, infrastructure, and natural resources. According to the US Forest Service wildfires can be caused by a variety of natural and human-related factors:

1. Lightning Strikes – One of the most common natural causes, especially during dry conditions, lightning can ignite trees or brush and lead to rapidly spreading fires.
2. Campfires and Outdoor Burning – Unattended or improperly extinguished campfires, burn piles, or fire pits can easily ignite nearby vegetation.
3. Discarded Cigarettes – Lit cigarettes thrown from vehicles or dropped on dry ground can start fires, especially during hot, windy weather.
4. Equipment Use and Malfunctions – Sparks from chainsaws, lawnmowers, or power lines can ignite fires in dry conditions.
5. Arson – Intentionally set fires remain a leading cause of wildfires in some regions and are particularly dangerous due to their unpredictability.
6. Agricultural and Debris Burning – Improperly managed burns on farmland or residential properties can escape control and ignite wildfires.

[6] DeLoss, J. (2024, December 18). *CSU study links climate change and earthquake frequency*. CSU SOURCE. https://warnercnr.source.colostate.edu/climate-change-earthquake-frequency/

7. Drought and Climate Conditions – While not direct ignition sources, prolonged drought and warmer temperatures create extremely dry vegetation, increasing the likelihood and severity of wildfires when ignition does occur.

Location: In South Hero, wildfire risk is generally concentrated in forests, fields, and undeveloped land outside of the village area where residential properties border wooded or brush-filled zones. Although the village is at a lower risk, wildfires can still threaten structures, utilities, and transportation routes, especially where development meets natural vegetation—commonly referred to as the wildland-urban interface (WUI).

Probability: The committee rated the probability as *unlikely*, however the fuel potential for large fires exists.

Extent: The town remains vulnerable during dry periods, particularly in spring and late summer when vegetation is highly flammable. The fire chief noted wildfires generally come in the form of grass fires of less than 5 acres in size. The potential extent of damage could be significant due to the large areas of forested land and limited wildfire protection from the on-call Fire Department. Major wildfire events have not occurred in South Hero and data on past damages is limited.

Wildfires pose a risk of injury or death to individuals who are unable to evacuate promptly. Delays in evacuation may result from sudden onset fires or from individuals who ignore warnings. Vulnerable populations—such as the elderly, people experiencing homelessness, residents with disabilities and functional access needs, are likely to face greater risk. Also, there is public health risk from smoke that reduces air quality, especially for people of all ages with respiratory issues such as asthma.

Impact: The committee rated the impact of wildfire as *negligibl*e to *minor*. There have been no large wildfires in South Hero, but if a wildfire were to occur, it could pose significant risks to public safety, property, and the environment especially in the wooded areas. Impacts may include the destruction of homes, barns, and other structures; loss of livestock or crops; interruption of utilities and services; and damage to critical infrastructure such as power lines or roads. Smoke from wildfires can also pose health risks, especially for individuals with respiratory conditions. In more severe cases, wildfires can lead to evacuations, economic losses, environmental degradation, and long-term recovery challenges. The psychological and social impacts on residents, especially those who lose property or face evacuation, can also be substantial.

Town Vulnerability

People: Wildfires can threaten lives through direct exposure to flames, smoke inhalation, and rapidly changing fire conditions that can force evacuations with little warning. They also impact public health over a broader area by degrading air quality and increasing respiratory and cardiovascular risks. People with disabilities or functional access needs (i.e. the elderly, those without housing, those without proper transportation) may potentially be impacted more than other residents.

Built Environment: Wildfires can destroy or severely damage homes, businesses, utilities, transportation corridors (i.e., US Route 2) and critical infrastructure (town garage, power infrastructure), especially in wildland–urban interface areas. Post-fire conditions can also increase risks to structures from debris flows and reduced slope stability.

Natural Environment: Wildfires can lead to significant environmental damage by destroying vegetation, altering wildlife habitats, and contributing to soil erosion. They also release large amounts of pollutants and greenhouse gases into the atmosphere, reducing air quality and impacting overall

ecosystem health. While ire is a natural ecological process, high-intensity or frequent fires can degrade forests and reduce biodiversity.

Economy: Wildfires can result in significant economic losses through property damage, firefighting and emergency response costs, business interruptions, and impacts on tourism, forestry, and agriculture. Long-term recovery may also require substantial investments in rebuilding, landscape restoration, and can lead to higher insurance costs and reduced property values.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase the frequency and intensity of wildfires due to rising temperatures and changing precipitation patterns.

Change in Land Use/Development: Increased residential development in rural areas, particularly through subdivisions and large lot estates, increases wildfire risks due to land clearing and proximity to forested areas. Increased development leads to greater human activity and infrastructure needs that could increase risk.

Change in Demographics: South Hero's population demographics are expected to increase moderately in the next five years and could increase the risk and impact of wildfires as more development encroaches on forested areas, creating a larger wildland-urban interface. This expansion may strain emergency services, increase the number of people and properties at risk, and elevate the potential for human-caused ignitions. Additionally, greater demand for land and resources could lead to increased fuel loads and reduced natural buffers.

History: The fire department does not keep detailed records for wildfires, so no details of past wildfires are available other than what was recorded in the State Fire Marshal's Report.

June 5 – 8, 2023: An air quality alert was issued for the entire state due to wildfires in Canada.

July 5 – 7, 2002: Smoke, from many forest fires across the Nemiscau region of northern Quebec, carried into Vermont from the evening hours of July 5 to the late evening of July 7. Advisories were issued warning people with respiratory problems to remain indoors and all individuals to curb outside activity. No major problems were reported to the National Weather Service because of this smoke.

Landslide – *Lo*w Risk

Description: A landslide is the downward movement of rock, soil, or debris on a slope due to gravity. Landslides can be triggered by factors such as heavy rainfall, rapid snowmelt, earthquakes, or human activity (like construction, rock cuts or deforestation).

According to the USGS, lakeshore erosion and landslides are related but distinct processes. Lakeshore erosion involves the gradual or episodic wearing away and removal of soil and sediment along the shoreline, primarily caused by wave action, fluctuating water levels, runoff, and ice movement. A landslide, in contrast, occurs when a mass of soil, rock, or debris moves downslope under the force of gravity, often as a result of slope saturation, erosion, or loss of support. Lakeshore erosion can contribute to future landslide susceptibility by undercutting the base of a slope and making it steeper or less stable.

Location: There are no traditional landslide areas in South Hero. The town has a relatively low elevation and no steep slopes. There are no large-scale clear cuts, road cuts or construction projects that could create landslide conditions. Lakeshore erosion does contribute to the gradual wearing away of soils along the

shorelines. West Shore Road near Rockwell Bay has a steep section of bank that is somewhat concerning. The top of the bank could use some reinforcement. Cooper Bay, Ladd Point and Robinson Point areas that have steeper shoreline areas.

Probability: The committee classified the probability of landslides as *unlikely* because there are no known landslide areas in town. The town has never been impacted by landslides. Shoreline properties may be impacted more by lakeshore erosion than actual landslides.

Extent: Extent of damages is unknown. There are no reported landslides in South Hero.

Impact: West Shore Road could be impacted by landslide. Associated properties could lose loss of lakefront property. Water wells and septic systems could be impacted. Power utility lines could be damaged as well causing power outages.

Town Vulnerability:

People: Residents, both year-round and seasonal, located along the lake shore are may be vulnerable to landslides. People with disabilities and functional access needs may have difficulty evacuating. Loss of housing could displace residents.

Built Environment: Primarily areas along West Shore Road and East Shore. Utility lines that are located along the shore line could impacted.

Natural Environment: Lake shore line could be lost along with trees and other vegetation whose roots help stabilize the slopes. Water quality could be impacted briefly by soil debris.

Economy: Minimal impact due to isolated location of landslides. Alternate routes would not be a burden.

Potential Future Impacts:

Climate Change: Potential future impacts can still arise if conditions change. More frequent or intense rainfall can saturate soil and weaken slopes along the lakeshore, potentially creating landslide conditions. More intense storms may increase erosion and slope instability. Longer wet periods can reduce soil stability, while alternating drought and heavy rainfall can contribute to cracking and erosion. If landslides develop in the future, roads (US Route 2, West Shore Road, utilities along Lake Shore areas, and drainage systems could be affected.

Change in Land Use/Development: If development expands along the lakeshore, potential impacts could occur. The conversion of a seasonal cottages and camps to year-round residences may increase exposure to climate-related hazards along the lakeshore. Potential impacts include increased shoreline erosion, storm damage, septic-system problems, changes in water quality, disruptions to property access, and increased cooling demands. Conversion of seasonal cottages to year-round homes can reduce the availability of seasonal housing and potentially increase property values and housing costs.

Change in Demographics: Changes in demographics may increase future exposure to landslide hazards as population growth, residential development, or conversion of seasonal properties to year-round residences increases the number of people living in or using areas near potentially unstable slopes. Increased development may also require new roads, driveways, drainage systems, and other infrastructure that could alter slope conditions and increase exposure to future landslides.

History: None.

Dam Failure – *No Risk*

Description: Dam failure can take several forms, including structural collapse or a breach. Dam failure can take several forms, including a collapse or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream.

Location: There are no dams in South Hero. The town is not impacted by dam failures of any kind.

Probability: The committee classified the probability of dam failure as *unlikely* because there are no dams in town.

Extent: Extent of damages would be non-existent.

Impact: None

Town Vulnerability:

People: None.
Built Environment: None. No dams are being proposed.
Natural Environment: None.
Economy: None.

Potential Future Impacts:

Climate Change: None.
Change in Land Use/Development: None
Change in Demographics: None.

History: None.

6. COMMUNITY CAPABILITIES

A hazard mitigation capabilities assessment evaluates a community's ability to reduce and manage risks associated with natural hazards. This assessment involves analyzing existing policies, programs, and resources to identify strengths and areas for improvement in mitigating hazards. The four key types of mitigation capabilities include planning and regulatory, administrative, and technical, financial and education and outreach. Below are the definitions of each key type:

- **Planning and regulatory:** Planning and regulatory capabilities are the codes, ordinances, policies, laws, plans and programs that guide growth and development.
- **Administrative and Technical:** Administrative and technical capabilities are the participant's staff, skills, and tools. These capabilities can be used for mitigation planning and to conduct specific mitigation actions.
- **Financial:** Financial capabilities are the resources to fund mitigation actions.
- **Education and Outreach:** Education and outreach capabilities are programs and methods that can communicate about and encourage risk reduction.

How This Plan Will Improve Existing Capabilities

South Hero's mitigation capabilities that reduce hazard impacts or that could be used to implement hazard mitigation activities. As South Hero goes through the update process for the planning mechanisms outlined in Table 10, the Town will look to the Hazard Mitigation Plan to help guide land use district decisions, and guide goals and policies for those districts.

Updates to each of the planning mechanisms outlined in Table 10 are handled by the identified responsible party. There is no timeframe for updating the referenced plans and regulations to better incorporate hazard mitigation, however, as each document is updated, the Hazard Mitigation Plan will be reviewed for incorporation. For example, The Local Emergency Management Plan is updated after Town Meeting each year, including updates to vulnerable geographic locations, as well as locations of residents and businesses who may be in harm's way. This information will be used to update the Local Hazard Mitigation Plan.

The goals of this Hazard Mitigation Plan will be incorporated in the upcoming Municipal Plan update to ensure that emergency preparedness and mitigation planning efforts are included, with particular attention to the identified mitigation actions. Additionally, the Hazard Mitigation Plan will be used to help prioritize high risk areas and target priority projects through Vermont's Municipal Roads General Permit Program and related funding. This will ensure this plan is utilized and project follow-through occurs.

Table 10: Planning and Regulatory Capabilities

Existing Protection	**Description / Responsible Party**	**Effectiveness / Enforcement / Hazard Addressed**	**Gaps in Existing Protection / Improvement Needed**
Planning and Regulatory Category			
South Hero Town Plan 2023-2031	Policies and vison for future land use. Adopted 2023. Planning Committee Chair	Policies that provide protection and limited development in wellhead protection areas, wetlands, steep slopes, and shallow soils. Flooding, fluvial erosion, lakeshore erosion, severe thunderstorms, winter storm (ice storm), hazardous materials.	Incorporate hazard mitigation projects into the Flood Resilience Chapter.
Development Regulations (January 2024)	Municipal laws that dictate how specific parcels of land can be developed and utilized. They govern factors such as property usage (residential, commercial, or agricultural), building height, lot size, setback distances from property lines, and environmental	Restrictions on development in potentially hazardous areas such as steep slopes, floodplains, lakeshore and water resource areas. Flood hazard rules are embedded directly within South Hero's combined Zoning, Flood Hazard, and Subdivision Regulations.	Will need updating to address new FEMA flood mapping estimated to be released in 2027.

	protections like flood zone restrictions. Their primary purpose is to promote orderly growth, protect natural resources, preserve property values, and ensure community safety. Zoning Administrator Development Review Board (DRB) Chair	Lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, hazardous materials.	
Emergency Management Plan	Summary of emergency response and emergency notification procedures. Adopted 2025. EMD	Updated annually. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire - wildland.	Conduct annual training on plan. Does not include continuity of operations annex.
Building Code	Regulations governing the design, construction, alteration, and structural integrity of physical buildings. They dictate how a structure must be built—setting minimum technical standards for foundations, framing, electrical systems, plumbing, mechanical work, and energy efficiency. Their primary goal is to ensure long-term structural safety and occupant welfare. Fire Chief	Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire - wildland.	Town does not currently have a building code and does not currently plan to adopt one, however new construction is expected to meet state energy requirement. The town may consider adopting building codes in the future.
Local Emergency Management Plan (LEMP)	Summary of emergency response and emergency notification procedures. Summary of emergency	Updated annually. Winter storm (ice storm), invasive species, lake shore	Conduct annual training on plan. Does not include continuity of operations annex.

	response and emergency notification procedures. Adopted 2025. EMD	flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire – wildland.	
Capital Planning	The Town engages in capital planning, primarily managed through its annual municipal planning processes, dedicated capital reserve funds, and the Town Plan. Selectboard Chair	South Hero uses dedicated capital reserve funds voted on by residents (such as Highway/Equipment reserves and building improvement funds) to plan for and finance major equipment, vehicle replacements, and municipal infrastructure. Winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Budget for long-term hazard mitigation projects
Road Erosion Inventory	Identifying location and severity of road erosion on road segments that are within 1,000 feet of surface waters. Survey completed in 2018 with annual updates. Town wide survey anticipated for 2027. Road Foreman	Road Erosion Inventory completed in 2018. Town applies for state funding annually to address road erosion issues. Highly effective in addressing Winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Does not include private roads.
Traffic Ordinance 2024	Establishes local traffic, speed, parking, and public right-of-way regulations. Selectboard Chair	Establishes special traffic regulations on public highways within the town. Ensures safety, order, and compliance with traffic laws by regulating speed limits,	The ordinance references penalties generally (Article XI), but fails to state explicit fine amounts (e.g., "$50 for overnight parking") or specify progressive fines for

		traffic control devices, parking, loaded vehicles, driveways, mobile vendors, and structures on public rights-of-way. Also provides enforcement mechanisms and penalties for violations.	repeat offense. It does not address pedestrian safety, bicycle traffic, or modern motorized equipment operating on public rights-of-way (such as e-bikes, ATVs/UTVs, or golf carts).
Administrative and Technical Capabilities			
Local Official Roles	**Responsibilities**	**Staffing**	**Improvements Needed**
Town Selectboard	Locally elected governing body responsible for decision making.	5 members.	Volunteer position. Paid small annual stipend. Filling multiple roles. Dedicated time on hazard mitigation may be limited.
Town Administrator	Professional administrator hired by the Selectboard to assist with the daily operations of municipal government, implement policies, assist staff and budgets, and coordinate the delivery of local services in accordance with Vermont law and local ordinances.	1 Town Administrator.	Filling multiple roles. Dedicated time on hazard mitigation may be limited.
Zoning Administrator	Enforces development regulations and supports land use planning.	1 part-time.	Limited hours. Dedicated time on hazard mitigation may be limited. Increase coordination with emergency management and attend substantial damage determination training.
Road Foreman and Crew	Manages day-to-day operations, crew management, and physical maintenance for the South Hero Highway Department.	1 full-time position with 2-person full-time road crew.	Consider training staff to assist with FEMA preliminary damage assessments and documentation coordination
Fire Chief	Lead and manage the fire department, directing emergency response operations, overseeing fire prevention and public safety programs, and	1 volunteer.	Challenges related to limited daytime response availability for volunteer department, volunteer recruitment and retention, training capacity, maintenance and

	coordinating preparedness, response, and recovery efforts for hazards and disasters within the community.		administrative workload.
Town Clerk, Town Treasurer,	The Town Clerk is Presiding Officer responsible for the administration and conduct of all town and general elections. The Treasurer oversees the collection of taxes and processes payments. Assists with annual capital budget.	1 full-time Town Clerk, 1 full-time Town Treasurer, 2 part-time assistant Town Clerk/Treasurers.	Challenges related to competing municipal priorities. Limited time for hazard mitigation.
Financial Capabilities			
Existing Protection	**Description / Responsible Party**	**Effectiveness / Enforcement / Hazard That is Addressed**	**Gaps in Existing Protections / Improvements Needed**
Annual Town Budget	South Hero uses dedicated capital reserve funds voted on by residents (such as Highway / Equipment reserves and building improvement funds) to plan for and finance major equipment, vehicle replacements, and municipal infrastructure. Selectboard Chair	Capital goals, municipal facility needs, and infrastructure priorities (such as community wastewater projects and highway asset management) are outlined in the South Hero Town Plan. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Federal and state hazard mitigation grants (such as FEMA's BRIC program or VTrans emergency relief funds) require a local cost-share match (typically 10%–25%). Establishing a dedicated "Hazard Mitigation Grant Match Reserve" ensures the town has immediate matching funds available to capture state and federal grants quickly after a major event or funding cycle open.
In Kind Services	Donations and volunteer support from residents Treasurer	Volunteers can assist with everything from event planning, municipal governance and emergency response support. Volunteers leverage local skills, labor and resources	Need system for tracking donations and volunteer time for in-kind match. Identify volunteer coordinator for community.

		without adding financial strain. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	
Emergency Relief and Assistance Fund (ERAF)	The Emergency Relief Assistance Fund (ERAF) provides state funding to match Federal Public Assistance after federally declared disasters. Selectboard Chair	Ensures communities have planned for emergencies and incentivizes additional resiliency measures (stream corridor protections) for additional match reduction. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Ensure highest possible protection. Missing FEMA approved mitigation plan. Ensure 2026 Vermont State Road and Bridge Standards were adopted.
Education and Outreach			
Existing Protection	**Description / Responsible Party**	**Effectiveness / Enforcement / Hazard That is Addressed**	**Gaps in Existing Protections / Improvements Needed**
Town Website and Social Media Sites	Municipal communications (such as warnings for Town Meeting, public hearings, and Selectboard meetings) follow standard Vermont statutory open meeting and public warning requirements (1 V.S.A. §	The Town relies heavily on traditional, static web infrastructure and regional third-party sites rather than active, direct emergency alert tools managed locally through its municipal website or dedicated social media.	The official town website functions primarily as an administrative document hub. During an emergency, it lacks an automated home-page banner system or real-time breaking news feed, making it slow and inefficient for urgent, rapidly changing

	312).	The website and town's social media lack an automated home-page banner system or real-time breaking news feed, making it slow and inefficient for urgent, rapidly changing conditions. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	conditions.
Social Media Emergency Preparedness Messaging	Provides residents with timely information about hazards, preparedness actions and available resources before, during, and after emergencies. Town Administrator	Aids dissemination of official municipal updates quickly, reduces misinformation, and improves public awareness and community resilience. Winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Can be limited by inconsistent staffing, outdated contact information, and the inability to reach residents who do not use social media or lack internet access. Research and consider purchasing an emergency / mass notification system or dedicating a municipal VT Alert administrator. Actively promoting public sign-ups for VT-Alert on municipal channels to ensure residents receive direct emergency broadcasts.

Administrative and Technical

The Town is governed by a volunteer Selectboard. Paid staff includes a Town Administrator, a Town Clerk, a Town Treasurer, 2 assistant Town Clerk/Treasurers, one part-time Zoning Administrator, one full-time road foreman and two full-time road crew members.

The Town has a Planning Committee and Development Review Board comprised of volunteers and supported by one part-time Zoning Administrator. The Zoning Administrator is response for the floodplain management program and continued compliance. Landuse development projects that require permits are reviewed for compliance with the Town's Land Use Regulations which include a Flood Hazard district with support from the State Agency of Natural Resources, and they include site visits and permitting as applicable. Any permits for conditional uses within the Flood District, such as substantial improvement to existing structures, new construction, recreation or open-air markets, etc. Are allowed only by approval from the Town's Development Review Board.

There is one full-time road foreman and a two-person highway crew who are responsible for maintaining miles of highway. The road crew is constantly maintaining roads during the winter months limiting their availability for other projects.

The Fire Department is comprised of volunteer members consisting of one Fire Chief and an average of 12 volunteers. The department can meet the needs of the communities and can activate mutual aid with neighboring departments if circumstances warrant.

Municipal Funds

The Town's capital budget is prepared and voted on every year during Town Meeting. Specific-use monies are then available to be drawn down throughout the year but only for a specific purpose such as paying for a reappraisal, capital equipment fund, and fire department and highway department trucks and equipment, etc. The Selectboard, Town Clerk, Town Treasurer and department heads annually prepare budgets for general government expenses and highway expenses including payrolls.

Grand List

The Listers and Tax Collector manages the municipal Grand List (property assessments), forming the foundation for property tax revenue that funds the majority of the town budget. The Fire Department, the Cemetery Commission, Library, Recreation Commission, Rescue Department each prepare an operating budget for their needs. At Town Meeting in March, these budgets are each presented to the taxpayers who vote to approve the allocation, with or without voter amendments. In early July, once the town has received both the updated Municipal Grand List from the Town Listers and the School Tax rate for the school district, the selectboard sets the Town tax rate for the coming year.

Table 11: Grand List Summary for South Hero, VT (2026)

Type	Number	Value Including Land
Residential Homes	62	$351,330,100
Seasonal Homes	83	$102,420,800
Mobile Homes – Unlanded	7	$4,205,650
Mobile Home - Landed	20	$6,223,500
Farms	9	$15,263,800

Commercial	31	$26,099,100
Commercial Apt	3	$2,764,200
Industrial	0	$0
Utilities	3	$11,634,100
Woodland	97	$0
Misc.	56	$12,259,500
Telecom	1	$1,484,900

National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a federal program in the United States aimed at providing insurance coverage for properties at risk of flooding. The NFIP was established in 1968 with the passage of the National Flood Insurance Act to address the lack of affordable flood insurance in high-risk areas and to reduce the financial burden on taxpayers for flood disaster relief. At the time of this writing, South Hero has been enrolled in the NFIP since June 15, 1978, and is currently in compliance. The adopted 2024 South Hero Development Regulations regulate development in the NFIP floodplain according to 1978 Flood Insurance Rate Maps. The Town is committed to enforcing floodplain regulations and ordinances to be eligible to participate in the NFIP program and protect the people and property of South Hero by restricting development in flood prone areas.

FEMA is in process of updating the FIRMs for the County which are due to be released in 2027.

Staffing, Enforcement and Continued Compliance in the NFIP

The Zoning Administrator enforces existing flood plain regulations and reviews future development proposals. If the Zoning Administrator is unavailable, the Selectboard may designate an alternate official to perform these duties to ensure regulatory continuity. Appeals of decisions made by the Zoning Administrator are handled by the Development Review Board (DRB), the community's designated Appropriate Municipal Panel under 24 V.S.A. § 4461. The Town works with the elected officials, the Northwest Regional Commission, VT Agency of Natural Resources and FEMA to correct and prevent any compliance issues.

River Corridor Bylaws

South Hero does not have a River Corridor Bylaw which aims to protect areas along rivers and streams that are prone to erosion and flooding. There are no rivers in South Hero. However, the town's Development Regulations contain lakeshore buffer protection rules. The Zoning Administrator is responsible for monitoring compliance.

Substantial Damage and Substantial Improvement

A permit and conditional use approval by the appropriate municipal panel is required for substantial improvement of existing buildings. Prior to issuing a permit, a copy of the application and supporting documentation shall be submitted by the administrative officer to the State National Floodplain Insurance Program Coordinator at the Vermont Agency of Natural Resources, Department of Environmental Conservation, River Management Section. Substantial improvement includes any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of the construction of the improvement. This term includes structures which have incurred substantial damage. Substantial damage includes damage of any origin sustained by a structure whereby the cost of restoring the

structure to its before damaged conditions would equal or exceed 50% of the mark value of the structure before the damage occurred.

Repetitive Loss

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended, 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

(a) That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or

(b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.

According to FEMA repetitive losses / BCX claims, there are 10 active NFIP policies in South Hero. There have been 14 claims since 1978 totaling $89,982. There are no repetitive loss properties in South Hero.

Structures in the Special Flood Hazard Area

There are approximately 55 structures within the SFHA in South Hero: 1 commercial building, 28 single family dwellings, 3 mobile homes, 2 seasonal homes and 21 camps. Of these, 7% of structures carry flood insurance. This represents 5% of E-911 surveyed structures within the community. Most of these homes are located along the Lake Champlain shore.

Critical Facilities

A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the appropriate jurisdictions, or fulfills important public safety, emergency response and/or disaster recovery functions. A list of critical facilities may be found in Appendix D.

Vermont's Emergency Relief Fund (ERAF)

ERAF provides state funding to match FEMA Public Assistance after federally declared disasters. Eligible public costs are generally reimbursed by FEMA at 75% with a 7.5% State match. The state will increase its match to 12.5% or 17.5% if communities take steps to reduce flood risk as described below. To receive the 12.5% state match rate, communities must have the following:

1) NFIP Participation
2) Municipal Road and Bridge Standards
3) Local Emergency Management Plan
4) FEMA approved Local Hazard Mitigation Plan

To receive the 17.5% state match rate, communities participate in FEMA's Community Rating System or adopt fluvial erosion hazard or adopt river corridor protection bylaw that meets or exceeds the Vermont Agency of Natural Resources regulations.

South Hero's ERAF rate currently is 7.5%. Upon adoption of the 2026 South Hero Hazard Mitigation Plan, the ERAF rate will increase to 17.5%.

7. MITIGATION STRATEGY

The following Mitigation Goals were developed by the Committee.

General Mitigation Goals

- Prevent / reduce the loss of life and injury resulting from all-hazards events.
- Prevent / reduce the financial losses and infrastructure damage incurred by municipal, residential, agricultural and commercial establishments due to disasters.
- Include hazard mitigation planning in the municipal planning process including the Town Plan, Capital Planning process and Local Emergency Operations Plan.
- Increase hazard mitigation public education and outreach
- Ensure the general public is part of the hazard mitigation planning process.

Identified Hazard Mitigation Actions, Programs and Activities

A mitigation action is a measure, project, plan or activity proposed to reduce or eliminate current and future vulnerabilities described in the risk assessment. Mitigation actions help achieve the plan's mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process. FEMA's mitigation action handbook identified actions within the following four categories that need to be considered:

Local Planning and Regulations: These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

Structure and Infrastructure Projects: These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.

Natural Systems Protections: This type of action can include green infrastructure and low impact development, nature-based solutions, and bioengineering to incorporate natural features or processes into the built environment.

Education and Awareness Programs: These types of actions keep residents informed about potential natural disasters. Educational outreach can help minimize these risks. Many of these types of actions are eligible for funding through the FEMA HMA program.

Prioritizing Mitigation Actions

Mitigation actions are listed in terms of mitigating threat or risk to public health and safety, reduction of hazard to community assets, adherence to the Town plan and local ordinances, cost, and feasibility. Actions are classified as either short - term or long - term activities. Short –term action items are activities which the municipality may be capable of implementing within one to two years. Long-term action items may require new or additional resources, funding or authorities. On-going action items occur at least once per year. Mitigation actions and their associated scores are listed in priority order, below.

Criteria for Analysis

The following criteria were used establishing an order of project priorities. Each of the following criteria was rated according to a numeric score of "1" (indicating Poor), "2" (indicating Average) and "3" (indicating Good). The highest possible score is 36. The full scoring matrix used is in Appendix B.

1) Does the action reduce damage?
2) Does the action contribute to community objectives?

3) Does the action meet existing regulations?
4) Does the action protect historic structures or structures critical to municipal operations?
5) Can the action be implemented quickly?
6) Is the action socially acceptable?
7) Is the action technically feasible?
8) Is the action administratively possible?
9) Is the action politically acceptable?
10) Is the action legal?
11) Does the action offer reasonable benefits compared to its cost of implementation?
12) Is the action environmentally sound?

Projects are classified as either short – term, medium–term or long - term activities.

- Short –term action items are activities which the municipality may be capable of implementing within six months to one year.
- Medium-term action items may be capable of being implemented in one to five years.
- Long-term action items may require 5 to 10 years, new or additional resources, funding, or authorities.

Cost – Benefit Review

Each project will incorporate a full benefit-cost analysis (BCA) following FEMA's BCA methodology and latest software to ensure cost effectiveness and maximize savings. There was a rough cost/benefit analysis performed using criteria in Table 11 with results listed in the Mitigation Actions Table 13.

Table 12: Cost - Benefit Review

Cost Estimate	
High	More than $100,000
Medium	Equals $50,000 - $100,000
Low	Less than $50,000
Benefit Estimates	
High	Public Safety
Medium	Infrastructure / Functionality
Low	Aesthetics / General Maintenance

Note: At the time of applying for FEMA's mitigation grant programs, each action listed in Table 13 will undergo the full benefit-cost analysis methodology (BCA version 4.8 and higher) to maximize savings.

Mitigation Actions

Table 13: 2018 Mitigation Actions Update

Hazard Mitigation Action	**Hazard Addressed**	**Responsible Party**	**Priority**	**Status**
Generator for Fire Station	All – hazards	Fire Chief	High	Completed.
Landon Road Culvert	Flooding, fluvial erosion, Winter	Road Foreman	High	Completed.

Upgrade	storm (ice storm). strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials,			
Martin Road Culvert Upgrade	Flooding, fluvial erosion, Winter storm (ice storm), strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials,	Road Foreman	High	Completed.
Kibbe Point Road Culvert Upgrade	Flooding, fluvial erosion, Winter storm (ice storm), strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials,	Road Foreman	High	Completed.t
NIMS / ICS Training for Selectboard / Highway Department	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Selectboard Chair	Moderate	Complete. Trainings offered on Semi Annual basis by state.
Update Bylaws to Incorporate	Flooding, fluvial erosion, winter	DRB Chair and Selectboard	Moderate	Pending. State Flood Act effective

River and Stream Corridor Protections	storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Chair		in 2017 where ANR will regulate river and stream corridor protections as defined in the Flood Act of 2024.
Construct new Salt/Sand Shed and Identify New Sand Supply Resource	Winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials.	Selectboard and Highway Department	High	Completed.

Table 14: 2026 Mitigation Actions

Hazard Mitigation Action	**Hazard Addressed**	**Hazard Mitigation Action Category**	**Responsible Party (bolded text = primary POC)**	**Estimated Timeline for Completion**	**Funding Source**	**Action Prioritization and Cost / Benefit**
Remove Properties Prone to Flooding Through Voluntary Buyouts	Flooding, fluvial erosion, winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado,	Structure and Infrastructure	**Selectboard Chair** Zoning Administrator	October 2026 – November 2029	Hazard Mitigation Grant Program (HMGP), Building Resistance Communities and Infrastructure Grant (BRIC), and Local Match	35 High / High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
	tropical storm, hurricane).					
Reinforce West Shore Road and bank at Rockwell Bay	Flooding, fluvial erosion, winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Structure and Infrastructure	**Selectboard Chair** Road Foreman	June 2027 – June 2028	Town Operating Budget, State Structures Grant	35 High/High
Update Flood Bylaw Regulations to Address FEMA Maps and the Vermont Flood Act.	Flooding, fluvial erosion, winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Local Plans and Regulations, Natural Systems Protection	**DRB Chair** Zoning Administrator	October 2026 – June 2027	Town Operating Budget	36 Low/High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Address lakeshore erosion issues at White's Beach in partnership with South Hero Land Trust and Friends of Northern Lake Champlain through bioengineering techniques.	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Natural Systems Protection	**Selectboard Chair** South Hero Land Trust	January 2027 – October 2029	General Fund, ANR Clean Water Service Provider Program	35 Medium / High
Update Road Erosion Inventory	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion.	Structure and Infrastructure / Natural Resource Protection	**Selectboard Chair** Road Foreman	May 2027 – July 2027	VAOT's Grants in Aid Funding	35 Low / Medium

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Implement necessary road improvements for compliance with the Municipal Roads General Permit.	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion.	Natural Systems Protection	**Road Foreman** Selectboard Chair	October 2026 – October 2027	Vermont AOT Grants in Aid, Local funds	35 Low / Medium
Development of Continuity of Operations Plan	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake,	Local Plans and Regulations	**Emergency Management Director** Selectboard Chair	January 2027 – January 2028	Town Operating Budget	35 Low/High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
	and major fire – wildland					
Incorporate hazard mitigation (e.g., storm water runoff, drought resistant vegetation, emergency shelter, etc.) into construction planning for Old White Meeting House.	Flooding, fluvial erosion, winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland	Structure and Infrastructure / Local Plans and Regulations	**Selectboard Chair** Chair of Meeting House Committee	January 2027 – December 2027	Town Operation Budget and ARPA funds.	35 Low/High
Enhance Public Awareness of home fire risks (smoke alarms,	Structure Fire, CBRN, Winter Storm (Ice Storm), Strong winds, Severe Thunderstorms,	Education and Awareness Programs	**Fire Chief**	December 2026 – December 2031	Town General Fund	34 Low / High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
carbon monoxide, fire extinguishers)						
Community Education Messaging: How to Prepare for Winter Conditions and Severe Winter Weather	Severe Winter Storm (Ice Storm), Strong Winds, Hail, Cold	Education and Awareness Programs	**Emergency Management Director** Health Officer	November 2026 – December 2030	Town General Fund	34 Low / High
Disease Vector Control Training for Municipal Officials (ticks, mosquitos, fleas that transmit pathogens like West Nile Virus and Lime Disease)	Infectious Disease Outbreak	Education and Awareness Programs	**Emergency Management Director** Health Officer, VDH	January 2027 – December 2030	Town General Fund	34 Low / High
Infectious Disease Education and Awareness Programs for the Public	Infectious Disease Outbreak,	Education and Awareness Programs	**Emergency Management Director** Health Officer, VDH	January 2027 – December 2030	Town General Fund	34 Low/High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Work with County Forester to provide educational tools, webinars, and field guides to help identify and implement strategies in response to invasive species threats	Invasive Species	Education and Awareness Programs	**Emergency Management Director** Recreation Director	January 2027 – December 2030	Town General Fund	34 Low/Medium

Mitigation Action Changes in Priorities

Mitigation actions changed priorities for several reasons, reflecting the evolving nature of risks, community needs and resource availability. Key factors that drove changes in mitigation actions and priorities may include:

- **Evolving Risk Landscape:**
  - Climate Change: As the impacts of climate change become more pronounced, priorities may shift towards addressing related risks like sea-level rise, increased frequency of extreme weather events, and changing precipitation patterns
- **Updated Hazard Data**:
  - Improved Understanding: Advances in science and technology provide better data and modeling, leading to new insights about hazard risks and vulnerabilities.
  - Recent Disasters: Experiences from recent disasters can highlight previously underestimated risks and lead to a re-evaluation of priorities.
- **Community and Stakeholder Input**:
  - Public Concerns: Community feedback and concerns can bring attention to specific vulnerabilities or areas in need of mitigation.
  - Stakeholder Engagement: Involvement of local businesses, non-profits, and other stakeholders can influence which mitigation actions are prioritized based on their expertise and needs.
- **Changes in Resources:**

  - Funding Availability: New funding opportunities or changes in budget allocations can shift which projects are feasible and prioritized.
  - Technological Advances: New technologies can provide more effective or cost-efficient mitigation solutions, altering priority actions.
- **Policy and Regulatory Changes:**
  - New Legislation: Changes in local, state, or federal regulations can necessitate updates to mitigation priorities to ensure compliance.
  - Policy Shifts: Shifts in government policy focus, such as increased emphasis on sustainability or climate resilience, can change priorities.
- **Demographic and Economic Changes**:
  - Population Growth: Increased population density in certain areas can raise the priority of mitigating risks in those regions.
  - Economic Development: As areas develop economically, there may be a higher priority placed on protecting new infrastructure and investments.
- **Critical Infrastructure Needs:**
  - Infrastructure Vulnerabilities: Identification of weaknesses in critical infrastructure (e.g., utilities, transportation networks) can lead to a prioritization of actions to fortify these systems.
  - Lifeline Services: Ensuring the resilience of essential services like water, power, and healthcare can become a higher priority in mitigation planning.
- **Previous Hazard Mitigation Projects:**
  - Project Completion: The completion of previous hazard mitigation projects may have resolved a hazard in a particular area that was of previous concern.

Integration Into Existing Plans and Procedures

For South Hero to succeed in reducing long-term risk, information from this Plan should be integrated throughout town operations. Integration actions include:

- The mitigation goals and risk assessment information can be incorporated into the next Town Plan update and into future flood hazard area regulations and river corridor bylaws
- Funding mitigation actions can be prioritized in the annual budget process
- Funding mitigation actions can be prioritized in grant research
- The risk assessment information can be incorporated into future training plans and budgets
- The hazard mitigation risk assessment and actions can be embedded into the LEMP

The following hazard mitigation information was captured in the 2023 Town Plan and should be captured in the Town Plan rewrite:

Facilities Utilities & Services:

- Strive to meet the basic needs of residents and access to affordable goods and services within Town, including in times of emergency.
- Encourage water conservation and the use of water conservation devices to ensure reliable water supply during drought or emergency situations.
- Support efforts to allow properly treated and filtered water from Lake Champlain to be used as potable water for domestic and business use, increasing resilience during emergencies.
- Ensure a robust emergency services communication infrastructure.
- Continue to promote co-location of telecommunication facilities and appropriate siting and screening of these facilities from larger towers to smaller residential dishes.

Infrastructure: Transportation and Energy

- Implement necessary improvements for compliance with the Municipal Roads General Permit.
- Maintain Town roads and sidewalks in good condition as municipal budgeting and natural contingencies allow, with emphasis on the safety of all users and in compliance with State regulations.
- Identify and upgrade undersized culverts to prevent washouts. Use best management practices for managing runoff during road construction or reconstruction.
- Communicate and coordinate with local residents on planned road improvements.
- To improve stormwater management by the implementation of best management practices to reduce stormwater runoff and control erosion.
- Review and evaluate Road and Driveway Standards to ensure they meet public safety standards (ensuring accessibility for emergency vehicles).
- Plan for increased electric demand with support from local utilities and Efficiency Vermont, ensuring the community can withstand disruptions and meet future needs.
- Support energy conservation and efficient use of energy across all sectors to reduce vulnerability to fuel shortages and price spikes.

Natural & Cultural Resources (Climate and Flood Resilience & Land Use)

- Encourage flood emergency Preparedness and response planning in South Hero.
- Encourage the protection and restoration of floodplains, wetlands and upland forested areas that attenuate and moderate flooding and fluvial erosion.
- The Town Plan endorses the recommendations of the LHMP.
- Maintain the Local Hazard Mitigation Plan (LHMP) grants access to post-disaster funding mechanisms, including the Emergency Relief and Assistance Fund (ERAF), Hazard Mitigation Grant Program (HMGP), and Building Resilient Infrastructure & Communities (BRIC) program.
- Annually adopt the Local Emergency Management Plans (LEMPs) and related hazard specific annexes. Strengthen regulations in the flood hazard areas beyond National Flood Insurance Policy (NFIP) minimums and consider adoption of the state river corridors to protect floodplain and stream resources, supporting public health and safety.
- Participate in the Agency of Natural Resources' Tactical Basin Plan process to protect and improve water quality.
- To protect the Lake Champlain shoreline and recognize its diverse and unique character, the Town
- Planning Commission and Conservation Commission shall keep apprised of lakeshore land use and identify shoreland areas that may be treated differently in the Town regulations.
- To focus future development toward areas most suitable for that purpose, and to promote planned development which does not exceed the physical capability of the land to support it (preventing development in high-risk or ecologically sensitive zones).

Education and Awareness

- Engage the whole community in planning efforts, especially those who may not typically be involved.
- Provide accessible information and opportunities for input to all residents.
- Strive for public participation in the planning process at all levels.
- Encourage citizen participation at all levels of the planning process and continue working with Town residents to turn their vision for the future into reality.

- Share information about programs that assist seniors or low-mobility residents to remain in their homes (e.g., HomeShare Vermont, Meals on Wheels, CIDER).
- Foster a community environment that stimulates lifelong learning and safety awareness.
- Inform lakeshore property owners about precautions to reduce flood risk (e.g., securing propane tanks, improving septic systems)
- Actively promote readily available educational materials and programs from regional and state partners designed to teach residents and local businesses individual steps they can take to minimize runoff and improve water quality.
- Provide public outreach and clear information to building permit applicants regarding residential and commercial building energy standards, ensuring safer structures.
- Encourage training for firefighters on solar and battery storage facility hazards.

8. PLAN MAINTENANCE

This Plan is dynamic. To ensure it remains current and relevant, it will be evaluated, monitored and updated every five years in accordance with FEMA guidelines in effect at the time.

Annual Monitoring and Evaluation

Within 12 months of FEMA Final Approval, the Plan will be annually evaluated and monitored as follows:

1. Three months prior to the anniversary of the FEMA Final Approval date, the Town Administrator and Selectboard Chair will evaluate the effectiveness of the Plan in meeting the stated goals. Items to be considered during this evaluation:
    - What disasters have the town or region experienced?
    - Should the list of highest risk natural hazard impacts be modified?
    - Are new data sources, maps, plans, or reports available? If so, what have they revealed, and should the information be incorporated into the plan?
    - Has development in the town or region occurred and could it create or reduce risk?
    - Has the town adopted new policies or regulations that could be incorporated into this plan?
    - Have elements of the plan been incorporated into new plans, reports, policies or regulations?
    - Are there different or additional community capabilities available for mitigation implementation?

2. Next, the Town Administrator and Selectboard Chair will monitor mitigation action progress. Items to consider:
    - Is the mitigation strategy being implemented or anticipated?
    - Were the cost and timeline estimate accurate?
    - Should new mitigation actions be added?
    - Should proposed actions be revised or removed?
    - Are there new funding sources to consider?

    The status (e.g. in progress, complete) of each action should be recorded in Table 14. If the status is “in progress” note whether the action is on schedule. If not, describe any problems, delays, or adverse conditions that will impair the ability to complete the action.

3. The public will have an opportunity to review the plan and provide updates a month prior to the Selectboard meeting during the month of the annual anniversary date of FEMA Final Approval. The Town Administrator will post hard copies at the Town office and post materials on the Town website and Facebook page for the public. Items to consider for public engagement:
    - Are there any new stakeholders to include?
    - Were there changes in population patterns (migration, density or makeup of socially vulnerable populations?
    - Were there any changes in land use and development?
    - What public outreach activities have occurred? At minimum, the town will publicly post notice of meeting when the plan is being evaluated.
    - How can the public involvement be improved?

4. Based on input received, the mitigation strategy and/or actions will be modified, if needed. The plan status and public input will be reviewed at Trustees meeting during the month of the annual anniversary date of FEMA Final Approval. A report (or public record in the form of meeting minutes) of the annual evaluation and monitoring will be made available to the public on the Town website and captured in the plan.

Table 15: Mitigation Action Status

Mitigation Action Status					
Mitigation Action	**2026**	**2027**	**2028**	**2029**	**2030**
Local Plans & Regulations					
Update Flood Bylaw Regulations to Address FEMA Maps and Vermont Flood Act.					
Development of Continuity of Operations Plan					
Structure & Infrastructure Projects					
Remove Flood-Prone Properties Through Voluntary Buyouts.					
Reinforce West Shore Road and bank at Rockwell Bay					
Update Road Erosion Inventory					
Implement necessary improvements for compliance with the Municipal Roads General Permit.					
Incorporate hazard mitigation (e.g., storm water runoff, drought resistant vegetation, emergency shelter, etc.) into construction planning for Old White Meeting House.					
Natural Systems Protection					
Implement necessary improvements for compliance with the Municipal Roads General Permit.					
Address lakeshore erosion issues at White's Beach in partnership with South Hero Land Trust and Friends of Northern Lake Champlain through bioengineering techniques.					

Outreach & Education Programs					
Enhance Public Awareness of home fire risks (smoke alarms, carbon monoxide, fire extinguishers)					
Community Education Messaging: How to Prepare for Winter Conditions and Severe Winter Weather					
Community Education Messaging: How to Prepare for Winter Conditions and Severe Winter Weather					
Disease Vector Control Training for Municipal Officials					
Infectious Disease Education and Awareness Programs for the Public					
Work with County Forester to provide educational tools, webinars, and field guides to help identify invasive species threats identify terrestrial threats like buckthorn, honeysuckle, and the emerald ash bore					

Plan Updating

This plan will be updated at a minimum every five (5) years as follows:

1. Initiate Plan Update – The Town Administrator should contact Vermont Emergency Management (VEM) to apply for funding approximately 2 years prior to the plan expiration date. It is assumed that the Town Administrator will serve as the primary point of contact for the Plan update.

   Once funding is secured and the grant agreement between the Town and State is in place, the Town Administrator can issue a request for proposals (RFP) to procure planning services in accordance with the grant agreement. The RFP should be issued approximately 14 months before the plan expires.

   Once a consultant is procured, the Plan update process can begin with a kick-off meeting including the consultant and local hazard mitigation planning team. The kick-off meeting should be scheduled approximately 12 months before the plan expires. The Town should allot approximately 8 months for the plan update process.

2. The Stakeholder Public Outreach Plan for LHMP should be reviewed and updated. Opportunities for whole community involvement throughout the Plan update process must be factored into the schedule. Whole community involvement must include the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These opportunities may include a community survey, planning workshop, and public meetings at critical milestones agreed to at the project kick-off meeting.

3. Once the local hazard mitigation planning team has prepared a final draft following a public comment period, they can seek authorization from the Trustees to submit the Plan for VEM/FEMA approval. Plan approval is accomplished in two steps. The first step is receiving “Approval Pending Adoption” from the VEM/FEMA review. The Town should submit for “Approval Pending Adoption” approximately 4 months before the plan expires to allow for time to respond to any review

comments received by VEM/FEMA. The second step is adopting the plan. Once the Town receives "Approval Pending Adoption", the Town Selectboard should adopt the plan by signing the resolution as soon as their next regular meeting.

4. Once adopted, the Town can submit the Plan and the signed resolution to VEM/FEMA. FEMA will issue the Town a letter with the date of "Final Approval". That date starts the clock on the 5-year cycle.

Appendix A: Resolution

RESOLUTION

A RESOLUTION OF THE TOWN OF SOUTH HERO SELECTBOARD ADOPTING THE 2026 TOWN OF SOUTH HERO HAZARD MITIGATION PLAN.

WHEREAS the Town of South Hero recognizes the threat that natural hazards pose to people and property within The Town of South Hero; and

WHEREAS The Town of South Hero has prepared a multi-hazard plan, hereby known as the 2026 Town of South Hero Hazard Mitigation Plan in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the 2026 Town of South Hero Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The Town of South Hero from the impacts of future hazards and disasters; and

WHEREAS adoption by The Town of South Hero Selectboard demonstrates its commitment to hazard mitigation and achieving the goals outlined in the 2026 Town of South Hero Hazard Mitigation Plan.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN OF SOUTH HERO SELECTBOARD, IN THE STATE OF VERMONT, THAT:

Section 1. In accordance with 24 VSA §872, The Town of South Hero Selectboard adopts the 2026 Town of South Hero Hazard Mitigation Plan. While content related to The Town of South Hero may require revisions to meet the plan approval requirements, changes occurring after adoption will not require The Town of South Hero Selectboard to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 17th day of October, 2026.

By: _____ (Signature)
Selectboard Chair

David C Carter (print name)

Appendix B: Mitigation Action Scoring Table

Mitigation Action	Criteria												Total Score
	1	2	3	4	5	6	7	8	9	10	11	12	
Remove Properties Prone to Flooding Through Voluntary Buyouts.	3	3	3	3	2	3	3	3	3	3	3	3	**35**
Reinforce West Shore Road and bank at Rockwell Bay	3	3	3	3	2	3	3	3	3	3	3	3	**35**
Update Flood Bylaw Regulations to Address FEMA Maps and the Vermont Flood Act.	3	3	3	3	3	3	3	3	3	3	3	3	**36**
Address lakeshore erosion issues at White's Beach in partnership with South Hero Land Trust and Friends of Northern Lake Champlain through bioengineering techniques.	3	3	3	3	2	3	3	3	3	3	3	3	**35**
Update Road Erosion Inventory	3	3	3	2	3	3	3	3	3	3	3	3	**35**
Implement necessary road improvements for compliance with the Municipal Roads General Permit.	3	3	3	2	2	3	3	3	3	3	3	3	**35**
Development of Continuity of Operations Plan	3	3	3	3	2	3	3	3	3	3	3	3	**35**
Incorporate hazard mitigation measures (e.g., storm water runoff, drought resistant vegetation, HVAC for warming / cooling shelter) for the Old White Meeting House.	3	3	3	3	2	3	3	3	3	3	3	3	**35**
Enhance Public Awareness of home fire risks (smoke alarms, carbon monoxide, fire extinguishers)	3	3	3	3	3	3	3	3	3	3	3	3	**34**
Community Education Messaging: How to Prepare for Winter Conditions and Severe Winter Weather	3	3	3	3	3	3	3	3	3	2	3	3	**34**
Disease Vector Control Training for Municipal Officials (ticks, mosquitos, fleas that transmit pathogens like West Nile Virus and Lime Disease)	3	3	3	3	2	3	3	3	3	2	3	3	**34**
Infectious Disease Education and Awareness Programs for the Public	3	3	3	3	2	3	3	3	3	2	3	3	**34**
Work with County Forester to provide educational tools, webinars, and field guides to help identify and implement strategies in response to invasive species threats	3	3	3	2	2	3	3	3	3	2	3	3	**34**

Appendix C: Major Disaster Declarations

(Source: FEMA.gov)

Note: Total Cost is the estimated total cost of the Public Assistance grant project in dollars without administrative costs. FEMA Obligated is the federal share of the Public Assistance grant eligible project amount in dollars, plus grantee (State) and sub-grantee (applicant) administrative costs.

Disaster Date(s)	Declaration Date	Hazard (Disaster Declaration) Total Cost and FEMA Obligated Public Assistance	Grand Isle County Declaration? (Yes/No)
Aug 11 – 24, 2024	September 11, 2024	Severe Storms and Flooding (DR-4816)	No
Jul 29-31, 2024	September 26, 2024	Severe Storms, Flooding, Landslides and Mudslides (DR-4826)	No
July 9 – 11, 2024	August 20, 2024	Severe Storms, Flooding, Landslides, Mudslides (DR-3609, DR-4810)	No
Jan 9 – 13, 2024	April 19, 2024	Severe Winter Storm (DR-4770)	No
Dec 18 - 19, 2023	March 2, 2024	Severe Storms and Flooding (DR-4762)	No
Aug 3 – 5, 2023	October 6, 2023	Severe Storms and Flooding (DR-4744)	No
July 7 - 21. 2023	July 14, 2023	Severe Storms, Flooding Landslides, and Mudslides (DR-4720) Total Cost: 0 FEMA Obligated: 0	Yes
July 10 - 14, 2023	July 10, 2023	Severe Storm and Flooding (DR-3595)	No
Dec 22-24, 2022	March 20, 2023	Severe Storms (Wind) and Flooding (DR-4695) Total Cost: 0 FEMA Obligated: 0	Yes
Jul 29-30. 2021	September 29, 2021	Severe Storm and Flooding (DR-4621)	No
January 20 – May 11, 2023	April 8, 2020	COVID-19 (DR-4532) Total Cost: n/a FEMA Obligated: n/a	Yes
October 31 – November 1, 2019	January 17, 2020	Severe Storm (Wind) and Flooding (DR-4474)	No
April 15, 2019	April 15, 2019	Severe Storms and Flooding (DR-4445)	No
May 4 – 5, 2018	July 30, 2018	Severe Storm and Flooding (DR-4380) Total Cost: 0 FEMA Obligated: 0	Yes
October 29 - 30, 2017	January 2, 2018	Severe Storm and Flooding (DR-4356) Total Cost: n/a FEMA Obligated: n/a	Yes
June 29 – July 1, 2017	August 16, 2017	Severe Storms and Flooding (DR-4330)	No
June 9, 2015	July 29, 2015	Severe Storm and Flooding (DR-4232)	No
December 9 – 12, 2014	February 3, 2015	Severe Winter Storm (DR-4207)	No
April 15 - 18, 2014	June 11, 2014	Severe Storm and Flooding (DR-4178)	No
December 20 - 26, 2013	January 29, 2014	Severe Winter Storm (DR-4163) Total Cost: n/a FEMA Obligated: n/a	Yes
June 25 – July 11, 2013	August 2, 2013	Severe Storms and Flooding (DR-4140)	No

May 22 – 26, 2013	June 13, 2013	Severe Storms and Flooding (DR-4120)	No
May 29, 2012	June 22, 2012	Severe Storm, Tornado, and Flooding (DR-4066)	No
August 27, 2011 – September 2, 2011	August 29, 2011	Tropical Storm Irene (DR-4022) Total Cost: 0 FEMA Obligated: 0	Yes
April 23, 2011 – May 9. 2011	June 15, 2011	Severe Storms and Flooding (DR-1995) Total Cost: 856,753.62 FEMA Obligated: 642,565.27	Yes
May 2011	November 8, 2011	Severe Storms and Flooding (DR-4043)	No
December 1, 2010	December 22, 2010	Severe Storms (Wind) (DR-1951)	No
December 11 – 18, 2008	January 14, 2009	Severe Winter Storm (DR-1816)	No
July 21 – August 12, 2008	September 12, 2008	Severe Storms and Flooding (DR-1790)	No
July 18, 2008	August 15, 2008	Severe Storms, a Tornado and Flooding (DR-1784) Total Cost: 150,002.09 FEMA Obligated: 112,501.58	Yes
June 14 - 17, 2008	June 14, 2008	Severe Storms and Flooding (DR-1778)	No
September 23, 2004	September 3, 2004	Severe Storms and Flooding (DR-1559)	No
June 5, 2002	June 15, 2002	Severe Storms and Flooding, Severe Wind (DR-1428)	No
June 17 – August 17, 1998	June 30, 1998	Severe Storms and Flooding, Rainfall (DR-1228)	No
January 6 - 16, 1998	January 15, 1998	Ice Storms (DR-1201) Total Cost: n/a FEMA Obligated: n/a	Yes
July 14 - 17, 1997	July 25, 1997	Excessive Rainfall, High Winds and Flooding (DR-1184)	No
June 12 – 14, 1996	June 27, 1996	Flooding (DR-1124)	No
January 19 – February 2, 1996	February 13, 1996	Storms and Flooding (DR-1101)	No
August 4 – 6, 1995	August 16, 1995	Heavy Rain, Flooding (DR-1063)	No
April 24 - May 26, 1993	May 12, 1993	Heavy Rain, Snowmelt & Flooding (DR-990) Total Cost: n/a FEMA Obligated: n/a	Yes
March 11, 1992	March 18, 1992	Flooding, Heavy Rain, Ice Jams (DR-938)	No
July 4 – 23, 1990	July 25, 1990	Flooding, Severe Storm (DR-875)	No
August 4 – 5, 1989	September 11, 1989	Severe Storms, Flooding (DR-840)	No
June 6 – 8, 1984	June 18, 1984	Severe Storms, Flooding (DR-712)	No
August 5, 1976	August 5, 1976	Severe Storms, High Winds & Flooding (DR-518)	No
June 28 - 30, 1973	July 6, 1973	Severe Storm, Flooding, & Landslides (DR-397) Total Cost: n/a FEMA Obligated: n/a	Yes

Appendix D: Extremely Hazardous Sites (EHS) and Critical Facilities, South Hero, VT

Hazardous Sites: Facilities required to report to federal, state, and local governments under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 for chemical emergencies. Sites listed are those that store, and/or use hazardous substances. *Critical Facilities: A facility that provides services and functions essential to a community, especially during and after a. disaster.*	
Critical Facility Senior Housing	Bayview Crossing 10 Carter Lane
Critical Facility Warming Shelter	Worthen Library Community Lane
Critical Facility School	Folsom Community and Education Center 75 South Street
Critical Facility Emergency Services	South Hero Public Safety Building 131 Community Lane
Critical Facility Water Treatment	South Hero Fire District #4 Water Treatment Facility 28 Hill Road
Critical Facility Health Care	Champlain Islands Community Health Center 52 Community Ln,
Critical Facility Transportation and Special Needs Services	Champlain Islanders Developing Essential Resources (CJDER) 12 Carter Lane
Hazardous Material Storage Area/Tier II Site	South Hero Short Stop 337 US Route 2 Fuel: S.B. Collins, Inc.
Critical Facility Government Site	South Hero Post Office 291 Route 2.
Critical Facility Emergency Services	South Hero Rescue Building 131 Community Lane.
Critical Facility Town Highway Dept	South Hero Town Garage 280 Route 2
Critical Facility Government Site	South Hero Town Office 333 Route 2
Hazardous Material Storage Area/Tier II Site Electric Utility	VELCO Appletree Terminal 117 Route 2.
Hazardous Material Storage Area/Tier II Site Electric Utility	VELCO South Hero Substation & VEC Substation 19 Eagle Camp Road

Appendix E: Hazard History for South Hero

Lake Shore Flooding and Inundation Flooding History

Dates	Description and Extent
June 1 – 18, 2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded its previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2 to 4 foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 percent). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York, and the delayed opening of two additional ferry crossings. Damage estimates will be incorporated into the May storm data, representing the crest of the flood waters, thus the time of the most significant impact and damage.
May 1 – May 31, 2011 April 13 – April 30, 2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded it's previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2-to-4-foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels

	were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 %). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York and the delayed opening of two additional ferry crossings.
April 20 – 30, 2007	The melting of snow from an above normal snow pack established in February, March and early April, as well as several rain events during the latter half of April, contributed to a significant run-off into streams and rivers of the Lake Champlain basin, which eventually deposited into Lake Champlain. Lake Champlain had been rising steadily since mid month, and at 7:15 pm LST on April 20th, finally exceeded its flood stage of 100.0 feet. Primarily...only minor shoreline flooding but was occasionally exasperated due to strong winds and wave action along the Vermont shoreline. Several summer camps, cottages experienced flooding as well as a few docks damaged as well. The lake would remain above flood stage through the end of April. There was $20,000 in damages reported between Grand Isle, Addison and Chittenden Counties.
May 1 – May 9, 2001	Snow melt and associated runoff due to the spring melt continued to result in flooding along the shores of Lake Champlain into May 2001. Lake levels remained above flood stage through May 9th, with generally minor flooding reported. There was approximately $21,000 in damages County-wide in April and approximately $17,000 in damages in May between the Grand Isle, Chittenden, Franklin, Addison and Rutland Counties.
April 23 – 30, 2001	Snowmelt and associated runoff due to the spring melt resulted in flooding along the shores of Lake Champlain. Lake levels reached the 100.99 ft. level (flood stage was 100 ft). Lakeshore flooding continued into the month of May.
April 1 – 13, 1998	Spring runoff and flood waters resulted in Lake Champlain rising to equal or exceeding 101 ft. during this period. The maximum level reached for the year was 101.82 ft. on April 5. Lakeshore flooding was widespread with water closing some roads and flooding some private properties. Due to the high lake level, water back flowed in some streams that flow into the lake. Some residents were forced to sandbag their properties for protection. There was an estimated $40,000 in property damages across the Grand Isle, Addison, Franklin and Chittenden Counties.
November 9, 1996	A strong cold front moved slowly across New York State Friday and Friday night and across Vermont Saturday. Periods of heavy rain occurred late Friday night into Saturday. Culvert and field flooding was reported in Grand Isle County Saturday morning. South Hero a storm total rainfall of 4.46 inches. County wide damages were approximately $50,000.
May 12 – 24, 1996	Continued runoff into Lake Champlain resulted in the lake level rising above the 100 foot mark with minor lake shore flooding. The highest level recorded during this period in May of 1996 was 100.90 feet on May 16, 1996.
May 2 – May 8, `1996	Runoff from melting snow and rainfall resulted in the Lake Champlain Lake level reaching or exceeding 100 feet. There was some minor flooding along the

	lake shore during this period.
January 19 -20. 1996	A strong storm system moved into the Great Lakes on Thursday and then moved into Canada on Saturday. The circulation associated with this storm resulted in above normal temperatures, strong winds and flooding due to snow melt and rainfall. Two deaths in the state were attributed to the flooding. Numerous roads were washed out due to the flooding statewide. Strong winds buffeted the state during Friday and Friday evening. Numerous power outages were reported. The flooding damaged many roads throughout South Hero. Damage estimates were $2,800,000 for the area affected.
April 16, 1994	A flood event caused approximately $500,000 in property damages county-wide.
May 1, 1993	A low-pressure system settled over the region producing heavy rains. Several local roads in Grand Isle County were inundated with flood waters due to blocked culverts. There was an estimated $500,000 in damages countywide

Winter Storm (Ice Storm) History

Dates	Description and Extent
January 25 – 26, 2026	An area of low pressure from the southern Mississippi River Valley to the Carolina coast with strong arctic high pressure north accounted for relatively rare accumulations of snow and ice from New Mexico to the Tennessee river valley on January 24th and 25th. Snow overspread the region during the afternoon with the heaviest into the early morning hours of January 26th with a temporary lull until mid to late morning. Snowfall totals were 8 to 10 inches along the international border with Canada with 10 to 18 inches elsewhere across the region with some localized amounts around 20 inches. There were no power outages, but there were numerous vehicle accidents. Snowfall totals across the county were 10 to 12 inches, including; 11 inches in Grand Isle and 10 inches in Alburgh.
March 28 – 29, 2025	A weak wave of low pressure developed and traveled along a stationary front draped across northern NY and VT during the evening of March 28th and continuing into the 29th. Snowfall amounts ranged from a dusting to a few inches across southern VT to a half foot or more in the northern sections. Meanwhile across the southern tier there was mixed winter precipitation, including freezing rain and icing that accumulated up to a half inch in some locations. Power outages across northern VT, mainly central and southern VT were around 20,000.
February 15 – 16, 2025	Snow overspread the region late Saturday afternoon, snowing heavily during Sunday before ending Sunday night. Some sleet mixed in at times Sunday across northern and central area with a complete changeover to sleet and freezing rain with some ice accumulations in southern areas before changing back to snow during the afternoon and evening. Scattered power outages were reported on February 17th due to strong winds more than 50 mph in northeast VT and in southern VT where it combined with some lightly ice laden trees. Combination of strong winds in excess of 40 mph and deep snow led to a 100-foot barn collapse in the town of Williamstown. The result was the barn was a total loss and at least 6 cows had died. Snowfall totals across Grand Isle County were 10 to 12 inches with brisk winds developing in the evening hours

	to begin blowing and drifting snow that caused some driving hazards of poor visibility and snow covered roads through February 17th.
April 3 – 5, 2024	A major storm across the Great Lakes remained nearly stationary during the afternoon of April 3rd as a coastal low developed off the NJ-DE that eventually moved to near Cape Cod, MA by midday April 4th. In addition, a strong area of high pressure was in Hudson Bay but was cresting toward northern New England and NY. Windy conditions developed across VT during the afternoon hours of April 3rd and continued into the early morning hours of April 4th. The stronger winds were located across southern VT where some wind gusts exceeded 50-60 mph with approximately 13,000+ outages due to wind. Mixed rain, sleet and snow developed in the afternoon and evening hours of April 3rd and then transitioned to heavy wet snow overnight through midday on April 4th. Snowfall totals ranged from 2 to 6 inches along the immediate lakeshore with 6 to 10 inches within 3-5 miles in the Champlain valley. Other snowfall totals were 8 to 12 inches within the immediate Connecticut River Valley with 12 to 20+ inches elsewhere across the state. Impacts were significant across the region with hundreds of motor vehicle accidents, numerous school closing and more than 35.000 power outages at its peak due to snow weighted trees on powerlines. Heavy, wet snowfall totals of 5 to 8 inches were common with nearly a trace along the immediate lakeshore. Some specific snowfall totals include; 8 inches in Alburgh and 6 inches in North Hero.
March 23, 2024	An area of low pressure moved from the southeast United States on March 22nd up the eastern seaboard to the NJ/DE coast by midday on March 24th and offshore by Cape Cod late at night on March 24th. Snow overspread Vermont, south to north, during the early morning hours of March 23rd and then exiting from west to east during the evening hours of March 23rd. The higher snowfall accumulations were across south central and southern VT, except along the MA/VT border where some mixed precipitation types occurred. Snowfall totals ranged from 3 to 6 inches in northwest VT, 6 to 12 inches across the rest of the Champlain Valley and northern VT, 12 to 18 inches in central VT with 18 to 24+ inches across south central VT with these higher totals mainly across Windsor and eastern Rutland counties. Impacts were largely travel related.
March 9 – 11, 2024	Low pressure across the Carolinas during the afternoon of March 9th moved slowly northeast along the coast across southeast Massachusetts during the morning of March 10th and lingered along the Maine/Nova Scotia border through the early morning hours of March 11th. The impactful weather occurred in two phases. The first phase occurred during the evening and overnight hours of March 9th with valley rain and elevated mountain wet and heavy snowfall, especially in the central and southern Green Mountain communities. The heavy wet snow greatly impacted the higher terrain and resulted in numerous tree damage, power outages (>30,000 outages) and travel disruptions. Snowfall was less prevalent in the valleys. The second phase occurred during the evening on March 10th through early afternoon on March 11th with northwest upslope enhanced snowfall across the northwest slopes of the central and northern Green Mountains as well as some interior valleys. This, combined with wind gusts in excess of 30 mph led to numerous travel disruptions. During the afternoon hours as the snow waned, northwest winds

	increased with frequent gusts in excess of 40 mph which led to delays in power restoration. Storm total snowfall from the evening of March 9th through the afternoon hours of March 11th ranged from 2 to 5 inches across the valley floors of the Champlain and the mid to lower Connecticut River valleys, 4 to 8 inches in elevations above 1000 feet and 10 to 18+ inches in the higher elevations (1500-2000+ feet), especially the northwest slopes.
January 24 – 25, 2024	A stationary surface boundary draped across northern NY/VT, during the evening and overnight hours of January 24th, was the focusing mechanism for moisture that entrained along the boundary and across the area. Temperatures were below freezing across much of central and eastern VT that allowed for several hours of light freezing rain during the evening and overnight hours. Flat ice accumulations were generally 0.1 to 0.2 inches with isolated amounts around 0.25 inches. The main impacts were icy, hazardous travel.
January 16, 2024	A weak coastal storm moved past southern New England on January 16th. Light snow overspread Vermont during the morning and ended during the evening. Snowfall totals ranged from 3 to 7 inches across the region with higher totals in the higher terrain of central VT. The main impacts were numerous traffic accidents, despite the dryness of the snow
January 6 – 7, 2024	Low pressure developed across the northern Gulf of Mexico coast during the evening hours of January 5th and traveled along the east coast moving off the southeast coast of New England by the afternoon of January 7th. Snow moved into Vermont during the evening hours of January 6th and exited by midafternoon of January 7th. Snowfall amounts across VT were generally 4 to 12+ inches with the lighter amounts in the northern Champlain Valley and Essex County with the higher snowfall totals (8-12+ inches) across the eastern slope communities of the southern and central Green Mountains. The main impacts from this storm were hazardous road conditions.
March 3 – 4, 2023	A double-barreled low-pressure system moved across southern New England on March 4th. Snow and rain mixed developed late at night on the 3rd and continued through the morning hours of the 4th. Snowfall totals were generally 7 to 12 inches across Vermont with 3 to 6 inches across the central and northern Champlain Valley.
February 23, 2023	A weak area of low pressure tracked west to east along a stationary boundary, south of New England during the overnight of February 22nd into February 23rd. The storm was a quick mover with about 6-8 hours of snowfall that accumulated 3 to 8 inches across the region, the heaviest in the southern and central Green Mountains.
January 25 - 26, 2023	Low pressure moved from the Ohio River Valley on Wednesday 1/25 to upstate New York and northern New England on Thursday 1/26. Meanwhile an area of low pressure developed along the associated boundary with the parent low across the tri-state region and moved across eastern New England. Snow overspread Vermont during the afternoon and evening hours of January 25th, heaviest during the evening hours before a lull in the steadiest precipitation as well as a change to mixed sleet and rain occurred during the nighttime hours. Light snow and snow showers redeveloped and moved across Vermont Friday before ending by evening. Snowfall amounts across Vermont ranged from 1 to 3 inches in southern VT, 3 to 6 inches in central VT with 6 to 12 inches in

	northern VT, especially in the higher elevation
January 19 - 20, 2023	Low pressure moved from the mid-Mississippi Valley on January 19th into New York by January 20th. In the meantime, an area of low pressure was developing across southeast Massachusetts and moving offshore. Snow and sleet overspread Vermont during the evening of January 19th, but then drier air allowed a lull in precipitation for much of the overnight hours before more snow and snow showers redeveloped and fell through the afternoon hours of the 20th.Widespread snowfall totals of 4 to 7 inches were observed, the higher totals across the higher elevations of the Green Mountains.
January 12 -13, 2023	Low pressure moved from the Ohio River Valley on January 12th across central/northern New England on January 13th. Snow overspread northwest Vermont during the evening of January 12th and continued overnight before exiting around midday on the 13th Snowfall totals across the region were generally 2 to 4 inches and restricted to northwest and northern Vermont due to milder temperatures and rain/snow mixed elsewhere across the state.
March 12, 2022	A series of weak low-pressure areas traversed along a cold front that moved across VT during the day of March 12th. Rain/snow mixed developed in the early morning hours changing to snow around sunrise and continuing until early to midafternoon. Snowfall amounts ranged from several inches in the lower Connecticut River Valley with 4 to 7 inches in the Champlain Valley with 6 to 12 inches elsewhere with the higher amounts mainly in northern sections. The initial wet nature of the snow led to numerous slick and icy roads accounting for numerous vehicle accidents.
February 18, 2022	An arctic front slowly moved from northwest to southeast across VT during the morning hours of February 18th, bringing much colder air. Meanwhile, a weak surface wave was traveling northeast along this boundary. The combination allowed light rain to change to freezing rain and eventually sleet and snow through the midday hours of February 18th. Ice accumulations were generally around a tenth (0.10) of an inch with sleet/snowfall totals of 1 to 2 inches that created hazardous travel.
January 17, 2022	A long tracked and powerful winter storm, with a history from the Mississippi River valley through the southeast and north along the Appalachians into the northeast, impacted VT on January 17th. Snow moved into VT around midnight of January 17th with snowfall rates of 1-2 inches per hour at times during the morning, eventually ending by early afternoon with residual snow showers during the evening and night. General snowfall accumulations in VT was 4 to 8 inches with the complexity of the storm due to its strength and strong low level jet accounted for mesoscale features of snowfall distribution with east-side upslope regions witnessing higher totals and west-side downwind communities witnessing less snowfall. In addition these strong low-level easterly winds did cause some downslope wind gusts (in excess of 50 mph) in the foothills of the western slopes of the Green Mountains and in the higher terrain in northeast VT which resulted in scattered power outages
December 25 – 26, 2021	Low pressure across the Great Lakes on Christmas Eve (December 24th) slowly traveled and transferred energy to a new coastal low near Cape Cod during the night of December 25th. This delivered a wintry mix of mainly light freezing rain and freezing drizzle beginning the morning of December 25th and ending as

	freezing drizzle and light snow on the morning of December 26th. Snow accumulations were an inch or two across the northern mountains and NE VT with ice accumulations generally a tenth of an inch or less, except locally up to 1/4 inch in the lower Connecticut River Valley with little activity along the Canadian border. Significant travel issues across VT during Christmas morning, especially in central and eastern VT with numerous vehicle accidents and the closure of portions of Interstate 89/91 and other roads at times.
December 18, 2021	A weak area of low pressure moved from the Ohio River Valley to southeast of New England on Saturday, December 11th. Snow moved into VT during the early afternoon and exited around midnight. Snow fell moderate at times, especially across central and southern VT. A widespread 4 to 6 inches fell across the northern third of the state with 5 to 8 inches in the central and south-central VT with lesser amounts in extreme southern VT due to mixed precipitation. There were no major impacts.
November 26 – 17, 2021	Weak low pressure moved along a cold front that moved across NY/VT during November 26th. Rain and rain showers transitioned into wet snow beginning at higher elevations around noon and eventually into the Champlain Valley by early evening. Snowfall ranged from a few wet inches in the Champlain Valley with 4 to 8 inches in the some of the higher elevations in the Green Mountains. The wet nature of the snow led to scattered power outages in the foothills.
April 21, 2021	Surface low pressure developed along a frontal boundary and moved northeast across SE New York, western southern New England and central New England on the 21st. Precipitation developed in the morning and mostly in the form of snow or mixed snow and rain, then as the intensity of the precipitation increased during the afternoon and evening hours, fell primarily as wet snow. Snowfall across Vermont ranged from 2 to 6 inches with a few localized amounts around 8 inches. In Rutland and Windsor counties south, it was primarily a rain event. Roads remained primarily wet, thus limited impacts.
February 16, 2021	A cross-country storm system, responsible for heavy snows in Seattle, snow, ice and report cold in the southern Plains and the Tennessee valley moved into New England during the overnight hours of February 15-16th. Snow overspread Vermont around midnight on the 16th, mixing with sleet and freezing rain before sunrise and ending by mid-morning. Combined snow and sleet accumulations were generally 3 to 6 inches with minimal icing from freezing rain. However, many roads were treacherous due to the wintry mix and many schools cancelled classes.
January 2, 2021	A weak to moderate upper level and surface storm system moved across the northeast, including New England late on New Year's into January 2nd. Snowfall was a general 4 to 8 inches across northern VT with the higher amounts across the counties bordering with Canada.
January 23 – 24, 2020	A late season weak area of low pressure moved across the Ohio River valley and developed a secondary area of low pressure south of New England during the afternoon and evening hours of March 23rd. Snow moved into northern NY by early afternoon and across Vermont by mid-afternoon. Initially surface/ground temperatures were above freezing but fell below freezing with accumulating snow as the snowfall rates approached up to 3 inches per hour. Total snowfall ranged from 2 to 4 inches in northwest VT to 4 to 7 inches across

	much of the state with pockets of 7 to 10 inches in eastern VT.
January 18 – 19, 2020	A quick moving area of low pressure, that originated in the Pacific northwest on January 15-16, moved across the central CONUS and eventually across New England on January 19th. Snow moved into northern NY during the afternoon of the 18th and exited by daybreak of the 19th. A widespread 2 to 4 inches fell across the central and southern Champlain Valley of VT, 4 to 7 inches across the rest of central and southern VT and 6 to 10 inches across portions of northern VT.
January 16, 2020	A clipper-like system quickly moved from the lower Great Lakes on the evening of January 15th, across central NY during the early morning hours of January 16th into the Gulf of Maine by midday. A west to east band of moderate to occasionally heavy snow moved across the southern Adirondacks and central VT during the overnight and morning hours of January 16th, where 4 to 8 inches of snow was observed. Lesser snowfall totals were measured across northern NY, northern VT and southern VT.
January 12, 2020	A moisture laden storm system tracked along a old cold front from the Gulf of Mexico up across NY and VT. On Saturday, January 11th, the front was positioned across southern Canada with temperatures in the 50s/60s across VT. As the front slowly progressed south into northwest VT during the late evening and overnight hours, moderate to heavy rain fell across the region. During the early morning hours of January 12th, the cold front slipped south into the southern portions of the Champlain Valley. Widespread 1/4 to 1/2 inches of ice accretion with locally up to 3/4 inch was observed along the international border, resulting in hazardous travel and scattered power outages.
December 29 – 30, 2019	A large, complex winter storm moved across the Great Lakes on December 29th and eventually stalled on December 30th and 31st. Meanwhile, secondary low pressure developed near Pennsylvania on December 30th and moved across southern New England on the 31st. A wintry mix of freezing rain, sleet and some snow moved into Vermont by the evening of December 29th and continued steadily until midday on December 30th before tapering to showers of mixed precipitation and snow on the afternoon of the 30th. Predominantly freezing rain and sleet fell across southern VT with sleet, freezing rain and some snow in central VT with snow and sleet in northern VT. Freezing rain accumulated 1/3 inch or less across Vermont's southern four counties with a sloppy 1-3 inches of snow, sleet and freezing rain in the Champlain Valley and 3 to 7 inches across north-central and northeast Vermont. Main impacts were hazardous road conditions Sunday night (29th) and Monday morning (30th). Strong wind gusts in excess of 40 mph occurred at times along the immediate western slope communities. Approximately 5000 customers were without power for the event, a combination of ice and wind effects.
March 22 – 23, 2019	Low pressure moved from the mid-Atlantic coast on March 21st and intensified rapidly as it moved to just off the Maine-New Hampshire coast on the 22nd. Precipitation started as rain the valleys and wet snow in higher elevations during the overnight of the 21st/22nd and changed to a wet snow for much of the 22nd before ending around daybreak Saturday (23rd) in the mountains. Snowfall totals ranged from 3 to 6 inches in the valleys below 500 feet, 6 to 12 inches around 1000 feet and 12 to 20+ inches in elevations above 1500 feet, especially in northern sections of the state. These wet snow conditions and

	eventual brisk winds of 15 to 25 mph with higher gusts later Friday and Friday night combined with the snow weighted trees and power lines to cause thousands of power outages to approximately 10,000-15,000 customers.
January 29-30, 2019	A storm system across the Great Lakes on the morning of January 29th traversed across NY and Northern New England during the afternoon and nighttime hours. A widespread 3 to 6 inches were observed across much of northern VT with 5 to 10 inches across central and southern VT.
January 8 – 9. 2019	A weak surface low across the Great Lakes on January 8th received upper atmospheric support during the night of the 8th and developed a significant winter storm off the NH/ME coast by the morning of January 9th as it slowly moved into Newfoundland by January 10th. Precipitation started as light rain, freezing rain and snow across Vermont during the evening of January 8th, changing to accumulating snow after midnight of January 9th. Snowfall was largely confined to mountain communities by midday of January 9th and continued until ending by late evening of January 10th. Snowfall amounts varied greatly (3-18+ inches) with the highest amounts along the west-northwest facing higher elevation communities of the Green Mountains in northern VT, due to a prolonged and climatological wrap-around/northwest up slope event. The heavy wet nature of the initial snowfall, as well as mixed with freezing rain, accounted for hundreds of school closings for the morning of January 9th. Some scattered power outages were observed with the heavy, wet snow as well.
November 27-28, 2018	A storm that brought blizzard conditions to parts of the Midwest on Sunday, November 25th moved into the Ohio River Valley - Southern Great Lakes on 11/26. The storm slowed considerably in the eastern Great Lakes, thus allowing a secondary low pressure system to develop near the Delmarva Peninsula during the evening of 11/26 and proceeded to move to near Boston by the morning of November 27th. Precipitation moved into the North Country by the afternoon of November 26th, falling as snow at elevations above 1500 feet and rain at lower elevations. By early morning of November 27th, the atmosphere cooled enough to allow for precipitation to change over to snow. Highest snowfall totals at elevations above 1500 feet, where more than 12-15 inches fell. The heavy wet snow accounted for more than 40,000 outages, affecting 100,000 customers without power due to snow loading on power lines.
March 13-15, 2018	A Nor'easter swept across eastern New England on March 13th and remained nearly stationary across eastern Quebec/Nova Scotia on the 14th-15th. This allowed a long duration snowfall event across Vermont with snow beginning during the morning of March 13th but the heaviest occurring during the night of March 13th through March 14th. The greatest snowfall occurred across the higher elevations of central and eastern VT with 1 to 2 feet or more being reported. Elsewhere snowfall totals were 8 to 18 inches. Limited impact as accumulating snowfall on roadways was limited to nighttime hours.
March 7 -9, 2018	An upper-level low across New England. snow began by midday and lingered with mountain snow showers on the 9th. Impacts were mainly travel related. Northwest Vermont snow totals ranged from 5 to 8 inches. Some power outages were reported.
December 25, 2017	A clipper storm system moved from the northern Great Lakes on December

	24th to New England on Christmas Day with a secondary development off the New England coast. A widespread 4 to 8 inches of snow fell across Vermont.
December 22, 2017	A quick moving storm system moved from the Ohio River Valley across southern New England and brought snow to Vermont during the morning commute and ending shortly after the evening commute. A widespread 5 to 10 inches of snow fell across central VT. The timing and intensity of the snowfall lead to hundreds of vehicle accidents and blocked highways for several hours.
December 13, 2017	On December 12, an energetic winter storm brought widespread snowfall of 4–8 inches across Vermont, with 8–12 inches common in eastern areas and localized totals exceeding 12 inches. Snowfall during both the morning and evening commutes, combined with brisk winds and blowing snow, created hazardous travel conditions across the state.
April 1. 2017	A storm system moved from the Ohio River Valley on March 31st to south of New England and then out to sea on April 1st. Wet snow, occasionally mixed with rain, began across Vermont by midday. Snowfall totals were generally 3 to 6 inches in the Champlain Valley and along the Canadian border with 6 to 12 inches elsewhere. The snow load of the heavy, wet snow did allow for some scattered power outages and numerous vehicle mishaps as well.
March 31, 2017	Wet snow, occasionally mixed with rain began across Vermont by midday on the 31st, but accumulations were limited due to above freezing temperatures and March solar radiation. An increase in snow intensity and lack of solar radiation, along with temperatures near freezing allowed for significant snowfall accumulations above 1000-1200 feet, especially in eastern and central parts of Vermont. Snowfall totals were generally 3 to 6 inches in the Champlain Valley and along the Canadian border with 6 to 12 inches elsewhere. The snow load of the heavy, wet snow did allow for some scattered power outages and numerous vehicle mishaps as well.
April 6 – 7, 2016	A slow-moving storm in the Great Lakes region delivered mild, moist air into a unseasonably cold, dry airmass across Vermont during the afternoon and evening of April 6th. Snow developed during the afternoon hours and remained nearly stationary across the Canadian border through the evening and night hours. Snowfall ranged from less than an inch across the southern Champlain Valley and southern Vermont to 4 to 6 inches along the Canadian border.
February 15 -16, 2016	A coastal low across the Carolinas on the morning of February 16th raced northward across the Champlain Valley of VT/NY during the day. This allowed for a wintry mix of snow, sleet, freezing rain and rain across the region and a strong east-southeast wind across portions of Vermont. Snowfall averaged 2 to 4 inches across much of Vermont with only 1 to 2 inches in the immediate Champlain Valley. Ice accretion was mainly a tenth of an inch or less. Main impacts were slick, sloppy roads but some isolated power outages due to wind gusts more than 40 mph along the western slopes of the Green mountains.
January 30, 2015	The remnants of a powerful winter storm that brought blizzard conditions to New Mexico and Texas, tornadoes in Texas and record flooding rains to portions of the Mississippi River Valley moved into the Great Lakes on December 29th bringing the first winter storm of the 2015-16 season to northern New York. Snow overspread Vermont around midnight and changed to sleet and freezing rain before ending in the afternoon. Snowfall across the

	area was 3 to 7 inches with limited icing. Routine impacts of vehicle accidents across the County occurred
January 27, 2015	A powerful nor'easter brought blizzard conditions to much of southern and eastern New England on January 26-27th. However in Vermont, snowfall was moderate across the region with snowfall totals ranging from a few inches in much of western and northern Vermont to 6 to 10 inches in southeast Vermont.
January 3 – 4, 2015	A winter storm on January 3–4 brought a mix of snow, sleet, freezing rain, and rain to Vermont, with most areas receiving 2–4 inches of snow and up to 0.1 inch of ice, while northeastern Vermont saw 3–7 inches of snow and up to 0.25 inch of ice. The combination of snow and ice created hazardous travel conditions and increased the risk of vehicle accidents and scattered power outages.
December 20 - 22, 2013	Two rounds of freezing rain accumulated around an inch across Grand Isle causing numerous vehicle accidents as well as damage to trees and utility lines. There were brief power outages during this time. There was an estimate of $250,000 of property damages from the event.
December 14 – 15, 2013	On December 15, 2013, a coastal storm brought the first widespread snowfall of the 2013–2014 winter season, producing 10–15 inches of snow across southeastern Vermont and 3–6 inches in northwestern Vermont. The storm primarily caused hazardous travel conditions and numerous vehicle accidents, particularly because it was the season's first significant snowfall
March 1, 2012	A powerful winter storm that brought blizzard conditions to portions of Wisconsin and Minnesota and severe weather to portions of the Tennessee River Valley on February 29th weakened as it moved across the Northeast on March 1st. There were two rounds of snowfall that moved across the North Country, the first during the evening and overnight of February 29th and the second during the daylight hours of March 1st. The first round delivered widespread 1-3 inches across much of Vermont with 6 to 10 inches along the east slopes of the central and southern Green Mountains. The second round delivered another 1-3 inches with some areas that witnessed 3 to 5 inches additional accumulation.
February 25, 2010	Heavy wet snow fell across the State that resulted in snowfall accumulations of 6 to 30 inches. The weight of the heavy snow accounted for widespread power outages across the region that resulted in upwards of 50,000 customers state-wide without power.
January 2-3, 2010	Near record snow fell across the county from a powerful Atlantic storm system. Northwest winds of 15 to 25 mph with higher gusts caused considerable blowing and drifting snow with 4-to-5-foot snow drifts reported. A record 33.1 inches of snow fell at Burlington International Airport in South Burlington.
February 19-21, 2009	A prolonged flow of cool, moist and unstable air created persistent snow showers across the northern Counties during the afternoon of February 20th and continued until the early morning hours of February 21st. There were significant snowfall amounts (more than 12 inches) observed at various ski resorts. From 3 to 8 inches of snowfall accumulated within Grand Isle County and across the Champlain Valley.

January 29, 2009	Snow overspread the State early in the morning and continued into the evening hours. Snowfall accumulations with this storm were generally 8 to 14 inches in the County. There were no reported damages.
February 14, 2007	Known regionally as the “Valentine’s Day Storm”. A winter storm blanketed most of New England. In Vermont, snow fell heavy at times from late morning through early evening before dissipating during the night. Snowfall rates of 2 to 4 inches per hour and brisk winds of 15 to 25 mph caused near whiteout conditions at times, along with considerable blowing and drifting snow, making roads nearly impassable. Temperatures in the single numbers combined with brisk winds created wind chill values of 10 degrees below zero or colder.
October 20, 2006	A low-pressure system brought cold air to the northern portion of the state. Heavy, wet snow accumulation of 3-6 inches occurred damaging many trees and causing power disruptions.
February 13, 2000	A storm system over the Ohio Valley tracked across central New England during Monday, February 14th. Heavy snow fell across the area with accumulations generally between 7 and 14 inches.
January 6, 1998	DR 1201. This storm is referred to as the Ice Strom of 1998. Snow turned to freezing rain. Ice accumulations were generally between 1 and 2 inches with locally greater accumulations over portions of Grand Isle County. The impact on the region was dramatic. Trees and power lines snapped due to the weight of the ice. Power outages lasted for several days. Damage to the utility companies ran in the millions. With no electricity, the agricultural community was unable to milk cows with loss of income and damage to cows. Travel was dramatically impacted and many roads and bridges closed due to ice and fallen trees. The National Guard assisted with cleanup operations after the storm. Falling tree limbs and other debris were a significant hazard during and following the storm. It is not known what the financial losses were to the Town because of the storm. There was $1,500,000 in damages in Grand Isle County. Public Assistance funding was $5,899,183.
April 10, 1996	A classic Nor’easter, this system spread snow across the region for nearly two days. The snow tapered off to flurries by late evening on the second day. The heaviest snow fell over and east of the Green Mountains with 7 to 14 inches. In the Champlain Valley 2 to 5 inches fell with heaviest amounts above the 700-foot level. The wet snow resulted in some power outages and minor automobile accidents across the state.
February 28, 1995	A low-pressure system which developed in the Ohio Valley resulted in a mixture of snow, sleet, and freezing rain across Vermont. Snow accumulations ranged from four to eight inches across much of Grand Isle County.
March 13-14, 1993	One of the worst storms of the century. Known as the "Blizzard of 93", it was one of the most powerful storms (Nor’easters) on record. The system moved up the Eastern Seaboard on the 13th and 14th coming close to breaking pressure and snowfall records in many locations. Snowfall amounts ranged from 10 to 28 inches across the state. Due to the weight of the snow that accumulated over March, there were numerous damage reports of barns and building roofs being damaged or at risk of collapsing

January 3, 1993	A combination of a cold surface and warm moist air aloft created freezing rain and freezing drizzle across the state. Road surfaces in Grand Isle County were covered in “black ice”. “Black ice” is a thin transparent form of ice allowing the black asphalt surface of a road to be seen through the ice. “Black ice” conditions typically result in numerous traffic accidents as motorists are unaware that the road surface is covered in ice.

Lake Shore Erosion and Fluvial Erosion

Begin Date	End Date	Description and Extent
05/04/2018	05/04/2018	An energetic storm system moved from the Great Lakes across the St. Lawrence Valley into Ontario/Quebec during the afternoon and evening hours of May 4th. Instability was marginal for thunderstorm development during the evening hours with thunderstorms ahead of a cold front. However, winds were unseasonably strong in the atmosphere, accounting for some thunderstorms to produce damaging winds and there was some localized damage in non-thunderstorm winds accompanying the arrival of colder air. Very brief heavy rainfall of up to 2 inches in less than an hour accounted for localized flash flooding and a mudslide. Strong winds and a lake level at/above flood stage caused for 4-to-6-foot waves to batter a causeway between Colchester and Grand Isle on Lake Champlain, resulting in numerous washouts and a closure of the causeway. y
09/08/2012	09/08/2012	A rapidly intensifying area of low pressure moved from the eastern Great Lakes across Quebec province Canada during the afternoon and evening hours of September 8th. A tight pressure gradient created strong southerly surface winds of 20 to 30 mph with frequent gusts more than 40 mph across the region. In addition, these strong winds delivered an abnormally warm and unstable air mass ahead of the surface low and cold front. As the cold front moved across New York during the afternoon, a squall line of severe thunderstorms developed and pushed east into Vermont. There was isolated minor wind damage in the form of large tree branches or small trees prior to any thunderstorms. Wind damage associated with thunderstorms was more widespread and significant.
06/01/2011	06/18/2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded its previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as

		well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2 to 4 foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 percent). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York, and the delayed opening of two additional ferry crossings. Damage estimates will be incorporated into the May storm data, representing the crest of the flood waters, thus the time of the most significant impact and damage.
5/01/2001 4/13/2011	5/31/2011 4/30/2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded it's previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2-to-4-foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 %). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York and the delayed opening of two additional ferry crossings.
4/20/2007	4/30/2007	The melting of snow from an above normal snow pack established in February, March and early April, as well as several rain events during

		the latter half of April, contributed to a significant run-off into streams and rivers of the Lake Champlain basin, which eventually deposited into Lake Champlain. Lake Champlain had been rising steadily since mid month, and at 7:15 pm LST on April 20th, finally exceeded its flood stage of 100.0 feet. Primarily...only minor shoreline flooding but was occasionally exasperated due to strong winds and wave action along the Vermont shoreline. Several summer camps, cottages experienced flooding as well as a few docks damaged as well. The lake would remain above flood stage through the end of April. There was $20,000 in damages reported between Grand Isle, Addison and Chittenden Counties.
06/23/2002	06/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero, VT resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle and waves battered the lake shore. .
09/06/1998	09/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. In Grand Isle County strong winds blew down power lines and 4 to 5 waves occurred on Lake Champlain.

Strong Winds (windstorm, thunderstorm, tornado, tropical storm, hurricane) History

Begin Date	End Date	Description and Extent
9/11/2023	9/11/2023	A weak area of low pressure traveling along a stationary front, draped across NY and VT, embedded in an unseasonably warm and unstable air mass resulted in a series of thunderstorms that moved across Vermont during the late afternoon and evening. Some of these thunderstorms produced damaging winds of downed trees and utility lines
7/21/2023	7/21/2023	A weak area of low pressure moved across a marginally unstable air mass across Vermont on July 21st. Scattered thunderstorms developed and moved across Vermont, some of these storms brought damaging winds
7/04/2023	7/4/2023	A mid atmospheric disturbance moved over an unstable airmass across northern Vermont during the afternoon hours of July 4th. Scattered thunderstorms rotated north to southeast across the region, some of them providing localized damaging winds.
7/12/2022	7/12/2022	A strong mid-level disturbance moved into a moderately unstable airmass across VT during the afternoon of July 12th. Scattered showers and thunderstorms developed across the state with scattered damage in southern-eastern VT and some isolated damage near the Canadian border. Some more organized wind damage occurred in the communities of Chester, Wood stock-Hartford, and White River Junction.
5/21/2022	5/21/2022	A mid-level disturbance moved into a moderately unstable airmass across Vermont during the late afternoon/early evening of May 21st. Scattered thunderstorms developed in NY and southern Quebec and intensified as

		they moved east into VT. Several reports of damaging winds and a few observations of hail greater than one inch in diameter were reported.
07/20/2021	7/20/2021	A healthy upper level trough and frontal boundary moved from Ontario into VT during the overnight hours of July 20th. Ahead of this system, a vigorous squall line of thunderstorms that developed in Ontario during the early afternoon hours moved across northern NY from mid-afternoon into the evening hours and evening hours across VT with numerous reports of damaging winds.
8/24/2020	8/4/2020	A mid-level disturbance moved through a moderately unstable air mass across eastern NY and western VT during the afternoon of August 24th. Scattered thunderstorms developed with a few producing localized damaging winds and large hail.
7/21/2020	7/21/2020	On July 21st, a developing surface low across the Great Lakes traveled along a stationary boundary draped across the North Country. Surface conditions became increasingly unstable during the afternoon with temperatures in the 80s and dewpoints in the 60s and lower 70s. More importantly, an unseasonably strong mid-atmospheric shortwave and winds aloft tracked across this region as well, which allowed for thunderstorms to develop rapidly, intensify, and maintain longevity. During the afternoon and evening, scattered to numerous thunderstorms developed traveled across northern New York and through Vermont. Several storms strengthened into supercells that produced widespread wind damage to trees, power poles and structures as well as large hail more than golf ball size in diameter. S
7/30/2019	7/30/2019	A weak upper-level disturbance moving through a very warm, humid, and unstable air mass lead to scattered thunderstorms, including several severe storms in the Champlain Valley of Vermont. Severe storms caused damaging winds in the form of downed tree limbs, trees, and utility lines. An elderly couple drowned while kayaking on Mallets Bay as the storm moved through.
6/30/2018	6/30/2018	Vermont and northern NY were influenced by a heat ridge but just on the periphery, thus thunderstorm clusters riding over the ridge across Ontario/Quebec into VT/NY along the international border Thunderstorms moved into VT/NY just around midnight on July 1st.
5/04/2018	5/4/2018	An energetic storm system moved from the Great Lakes across the St. Lawrence Valley into Ontario/Quebec during the afternoon and evening hours of May 4th. Instability was marginal for thunderstorm development during the evening hours with thunderstorms ahead of a cold front. However, winds were unseasonably strong in the atmosphere, accounting for some thunderstorms to produce damaging winds and there was some localized damage in non-thunderstorm winds accompanying the arrival of colder air. Very brief heavy rainfall of up to 2 inches in less than an hour accounted for localized flash flooding and a mudslide. Strong winds and a lake level at/above flood stage caused for 4-to-6-foot waves to batter a causeway between Colchester and Grand Isle on Lake Champlain, resulting in numerous washouts and a closure of the causeway.

9/11/2016	9/11/2016	A cold front moved across New York during the early morning hours and Vermont during the morning hours of September 11th. Preceding this cold front was a solid line of showers and thunderstorms that stretched from the Canadian border south to the Massachusetts border that moved across VT in the pre-dawn hours. Scattered severe thunderstorms knocked down numerous trees and caused subsequent power outages.
8/28/2016	8/28/2016	Scattered thunderstorms developed ahead of a cold front across northern VT during the afternoon of August 28th. A few of these storms did produce isolated wind damage to trees.
7/22/2016	7/23/2016	A disturbance moved across the Canadian border during the overnight of July 22-23rd and developed some strong to severe thunderstorms with a few producing locally damaging winds. Significant and widespread damage occurred with more than 20,000 utility outages.
6/28/2016	6/28/2016	A cold front moved across a marginally unstable air mass during the afternoon of June 28th developing thunderstorms in the Adirondacks of New York that eventually moved into the Champlain Valley and elsewhere in Vermont. A few isolated thunderstorms did deliver strong gusty winds and hail just under an inch in diameter. Some slow moving and training storms did deliver localized 2 to 4 inches of rain in north-central and northeast Vermont for some minor flash flooding. Lightning struck a large home in South Hero Vermont which caused a fire that destroyed the home.
6/25/2013	6/25/2013	A warm moist airmass provided the fuel for severe storms and flash flooding on June 25, 2013.
9/08/2012	9/08/2012	A rapidly intensifying area of low pressure moved from the eastern Great Lakes across Quebec province Canada during the afternoon and evening hours of September 8th. A tight pressure gradient created strong surface southerly winds of 20 to 30 mph with frequent gusts more than 40 mph across the region. In addition, these strong winds delivered an abnormally warm and unstable air mass ahead of the surface low and cold front. As the cold front moved across New York during the afternoon, a squall line of severe thunderstorms developed and pushed east into Vermont. There was isolated minor wind damage in the form of large tree branches or small trees prior to any thunderstorms. Wind damage associated with thunderstorms was more widespread and significant.
7/23/2012	7/23/2012	A quick moving disturbance across Ontario and Quebec provinces in Canada pushed a warm front across the region during the morning and early afternoon of the 23rd, followed by a cold front during the night. Numerous thunderstorms developed ahead of the cold front in northern New York and intensified as they moved into Vermont during the late afternoon and evening hours. There were numerous reports of damaging winds and large hail.
7/04/2012	7/04/2012	A moderately strong upper-level disturbance ahead of a surface cold front moved across southern Quebec during the afternoon and evening hours of July 4th. These disturbances moved into a warm and unstable air mass and developed thunderstorms in southern Quebec, which moved

		across northeast Vermont during the afternoon hours and the Champlain Valley during the evening. Both episodes contained widespread wind damage and frequent lightning. In the afternoon, the communities of Walden, Cabot, West Danville, and Danville were most affected. During the evening storms, significant damage occurred in the Champlain Valley in communities like Colchester, Burlington, South Burlington, Essex, and Hinesburg. A wind gust of 65 knots was observed at Diamond Island on Lake Champlain, and 55 knots was observed at the NWS office at Burlington Int'l airport. Despite the holiday festivities, no serious injuries were reported.
5/29/2012	5/29/2012	A warm front moved across Vermont during the morning hours of May 29th, which lead to numerous thunderstorms with heavy rain, damaging lightning and some isolated large hail and strong winds. Some of these thunderstorms deposited up to 2 inches of rainfall in portions of north-central and northeast Vermont. A warm, humid, and unstable air mass was draped across the region in the afternoon with an approaching cold front from Ontario, Canada. Numerous thunderstorms developed ahead of the cold front during the afternoon crossing New York into Vermont. There were numerous reports of hail greater than an inch in diameter, damaging winds, along with a confirmed EF0 tornado in West Glover VT. Some of these storms trained across the same areas, including those that witnessed two inches of rain earlier in the day. The result was flash flooding in portions of north-central, northeast Vermont and Addison County with radar estimated storm total rainfall of 3 to 5 inches.
5/16/2012	5/16/2012	A cold front and mid-atmospheric disturbance moved across Vermont during the afternoon of May 16th. Scattered thunderstorms developed with a few of them containing hail up to one inch in diameter.
6/26/2009	6/26/2009	On the afternoon of June 26th, an unseasonably cold and strong upper level low pressure system was located across eastern Canada. Mid-level shortwave energy rotated around this upper low into a moderately unstable air mass across northern New York and Vermont. This resulted in widespread thunderstorm activity, some of which produced large hail and brief strong winds across portions of Vermont.
7/26/2008	7/26/2008	A mid-atmospheric disturbance moved across northern New York and the northern Champlain Valley of Vermont during the afternoon of July 6th. Scattered thunderstorms developed in the Adirondacks and moved across the northern Champlain Valley of Vermont. There were some isolated reports of wind damage in Grand Isle, Chittenden, and Franklin counties in Vermont.
7/18/2008	7/18/2008	Several mid-atmospheric impulses traveled along a stationary boundary across northern Vermont during the early afternoon and evening hours of July 18th. This stationary boundary separated warm, humid air across much of Vermont from cooler, drier air across the international border with Canada. Several rounds of thunderstorms moved across northern Vermont during the afternoon of July 18th. A developing squall line across the Champlain Valley of New York moved into northwest Vermont by mid-afternoon and continued across the state. Widespread tree and

		structural damage occurred with this system in Grand Isle, Franklin, Lamoille, and Orleans counties. This squall line interacted with an individual thunderstorm near Fletcher, that eventually produced an extensive damage path around 7 miles in length between North Cambridge and Waterville (Lamoille County), caused by straight-line winds of 60 to 80 mph. However, within this greater damage field was a tornadic storm with two very brief touchdowns with EF0 and EF1 damage. Another area of thunderstorms moved across central Vermont with pockets of significant damage across Addison, Washington, and Orange counties.
6/10/2008	6/10/2008	A very energetic mid-atmospheric disturbance moved across the Great Lakes during the afternoon and evening of June 10th. This developed a surface low along a cold front, which moved across Vermont during the afternoon and evening hours. These features moved into a very warm, humid, and unstable airmass draped across Vermont that resulted in two rounds of widespread severe thunderstorms. The first round moved across Vermont during the early to midafternoon hours and the second round occurred during the evening. In Vermont...hundreds to thousands of trees were damaged, downed or uprooted which caused downed power lines and structural damage to numerous buildings and vehicles.
8/16/2007	8/16/2007	Scattered thunderstorms developed in a moderately unstable airmass across the Champlain Valley of New York during the afternoon of the 16th. One thunderstorm developed in a favorable, highly sheared wind environment which eventually intensified into a supercell thunderstorm in Clinton County, NY. This supercell then proceeded to travel into Vermont affecting numerous communities between Grand Isle (Grand Isle County) and Concord (Essex). Significant straight-line wind damage (estimated between 60 and 80 mph) in the form of snapped, uprooted and downed trees, downed power lines and some structural damage occurred in Grand Isle, Georgia (Franklin), Westford (Chittenden) and Hardwick (Caledonia). Also, there were several thunderstorms, including a supercell that developed in the northern Hudson Valley of New York and moved across Rutland and Windsor counties in southern Vermont. Significant straight-line wind damage (estimated between 60 and 80 mph) in the form of snapped, uprooted, and downed trees, downed power lines and some structural damage occurred as well in Rutland (Rutland County) and surrounding communities.
7/13/2007	7/13/2007	An unseasonably cool and strong upper-level trough moved across northern New York and Vermont during the late morning and early afternoon hours of the 13th. A few thunderstorms developed in northern New York and moved into northwest Vermont. A few thunderstorms became locally severe and caused wind damage in the form of a few downed trees in Milton (Chittenden) and Isle La Motte (Grand Isle).
8/07/2006	8/07/2006	A strong westerly low-level flow interacted with a moderately unstable airmass across northern New York and northern Vermont on the afternoon of the 7th. The result was scattered thunderstorms across the region, including a supercell structure that developed over Clinton County, New York and crossed Lake Champlain into Isle LaMotte in Grand

		Isle County, Vermont. Numerous trees were downed, uprooted, and snapped and powerlines were downed by damaging winds along West Shore Road, Main Street and School Street. There was some property damage due to trees falling on structures and vehicles, but also a garage door was partially blown in due to excessive winds.
6/19/2006	6/19/2006	A surface trough and mid-level atmospheric disturbance encountered a very warm and humid airmass across northern New York around midday on the 19th and developed a line of thunderstorms, which intensified as they moved into the Champlain Valley by early afternoon. These thunderstorms produced severe weather, in the form of wind damage, across Grand Isle County, Vermont with numerous trees down in Isle LaMotte as well as large branches and trees down in Grand Isle and North Hero.
8/02/2005	8/02/2005	A humid airmass was in place with dew points 65 to 70 as an upper-level disturbance contributed to thunderstorm development. Thunderstorms were severe in the northwest Vermont county of Grand Isle where trees were blown down across Rte. 2 in Alburgh.
7/22/2005	7/22/2005	A cold front extended from northern Maine to extreme northern New York and then into Pennsylvania early on Friday, July 22. The front helped trigger thunderstorms as it moved across northern NY by early afternoon, and across Vermont during the afternoon. Thunderstorms developed along a boundary in northeast NY in the late morning and they quickly intensified into severe thunderstorms with strong winds and large hail as they moved east and southeast across the area. In the Vermont town of North Hero, hail up to 1 3/4 inch in diameter fell, with power outages reported. Lightning struck a boat on Lake Champlain near Grand Isle Station, with extensive damage resulting.
7/05/2005	7/05/2005	Thunderstorms resulted in strong winds which blew down trees in the Vermont town of North Hero.
8/29/2004	8/29/2004	A frontal boundary across northern Vermont and northern New York helped focus thunderstorms across this area. The airmass was very humid along and south of the front. Very heavy rainfall accompanied the thunderstorms. A few thunderstorms were severe, with trees blown down across roads in both Alburg and South Alburg. In addition, a trailer was blown over in Alburgh.
7/08/2004	7/08/2004	An area of low pressure moved across Quebec, Canada during Thursday, July 8th. The associated cold front moved across the area in the afternoon, preceded and accompanied by thunderstorms. In Vermont's Grand Isle County, the towns of Grand Isle and Alburg both reported nickel size hail from late afternoon thunderstorms. In addition, trees and branches were blown down in Alburgh.
7/03/2002	7/03/2002	A cold front along the Canadian-United States border triggered locally severe thunderstorms Wednesday night, July 3rd.
6/23/2002	6/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle.

8/10/2001	8/10/2001	Early morning thunderstorms resulted in a lightning strike which set fire to and destroyed a garage attached to a house.
7/10/2001	7/10/2001	Thunderstorms developed in an unstable airmass ahead of a surface trough during the afternoon and evening hours. Large hail was reported with locally gusty winds.
7/09/2001	7/09/2001	A moist unstable air mass was in place across Vermont, as an area of weak low pressure moved across southern New England and triggered late afternoon and evening thunderstorms. A thunderstorm produced nickel size hail in the town of Alburgh.
6/16/2001	6/16/2001	A cold front moved from west to east across Vermont Saturday evening. Thunderstorms preceded and accompanied the front with heavy rain and gusty winds across the county. In North Hero, the wind gusted to 28 mph (24 knots) between 6 and 630 PM EDT (5 and 5:30 PM EST).
7/05/1999	7/05/1999	A mesoscale convective system consisting of a cluster of thunderstorms moved across northern NY and northern Vermont during the early morning hours of Monday, July 5th. There were numerous reports of trees and power lines blown down. For example, in Grand Isle County of Vermont, trees and large branches were blown down in Alburg Springs.
9/06/1998	9/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. Specifically, near Alburg (Grand Isle County), strong winds blew down power lines.
6/15/1996	6/15/1996	A cold front moved across Vermont during the late morning and afternoon hours of Wednesday, June 5, 1996. Scattered thunderstorms were accompanied by small hail at several locations including. Sutton, Vermont (Caledonia County) pea size hail at 1030 am Est, North Hero, Vermont (Grand Isle County) 1/4-inch hail at 1055 am Est with gusty winds. Burlington, Vermont (Chittenden County) pea size hail at 11 am.
8/22/1997	8/22/1997	An unstable atmosphere across the region associated with an upper level low over the Great Lakes resulted in numerous thunderstorms with reports of some hail.
6/22/1998	6/22/1998	A cold front moved across Vermont during the afternoon hours. Heavy rain and locally large hail accompanied a few of the thunderstorms with this front. The Grand Isle ferry reported wind gust to 43 knots and nickel size hail in the Vermont waters of Lake Champlain, approximately 2 miles Southwest of Grand Isle Station, Vt. Lightning struck and damaged a barn in South Hero.
6/23/2002	6/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero, VT resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle.
6/23/2002	6/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero, VT resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle.

8/10/2001	8/10/2001	Early morning thunderstorms resulted in a lightning strike which set fire to and destroyed a garage attached to a house.
7/10/2001	7/10/2001	Thunderstorms developed in an unstable airmass ahead of a surface trough during the afternoon and evening hours. Large hail was reported with locally gusty winds.
7/09/2001	7/09/2001	A moist unstable air mass was in place across Vermont, as an area of weak low pressure moved across southern New England and triggered late afternoon and evening thunderstorms. A thunderstorm produced nickel size hail in the town of Alburgh.
6/16/2001	6/16/2001	A cold front moved from west to east across Vermont Saturday evening. Thunderstorms preceded and accompanied the front with heavy rain and gusty winds across the county. In North Hero, the wind gusted to 28 mph (24 knots) between 6 and 630 PM EDT (5 and 530 PM EST).
7/5/1999	7/5/1999	A mesoscale convective system consisting of a cluster of thunderstorms moved across northern NY and northern Vermont during the early morning hours of Monday, July 5th. There were numerous reports of trees and power lines blown down. For example, in Grand Isle County of Vermont, trees and large branches were blown down in Alburg Springs.
9/06/1998	9/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. Specifically, near Alburg (Grand Isle County), strong winds blew down power lines.
6/22/1998	6/22/1998	Lightning struck and damaged a barn in South Hero.
8/28/1997	8/28/1997	A cold front moved across Vermont during the afternoon hours. Heavy rain and locally large hail accompanied a few of the thunderstorms with this front. The Grand Isle ferry reported wind gust to 43 knots and nickel size hail in Lake Champlain, approximately 2 miles Southwest of Grand Isle Station.
8/22/1997	8/22/1997	An unstable atmosphere across the region associated with an upper level low over the Great Lakes resulted in numerous thunderstorms with reports of some hail.
6/05/1996	6/05/1996	A cold front moved across Vermont during the late morning and afternoon hours of Wednesday, June 5, 1996. Scattered thunderstorms were accompanied by small hail at several locations including. Sutton, (Caledonia) pea size hail at 1030 am Est, North Hero, (Grand Isle) 1/4 inch hail at 1055 am Est with gusty winds. Burlington, (Chittenden) pea size hail at 11 am.

Extreme Cold History

Begin Date	End Date	Event Description and Extent
2/03/2023	2/04/2023	An arctic airmass entered Vermont during the morning hours of February 3rd (Friday) and continued through the evening hours of February 4th (Saturday). Daytime actual temperature readings fell during Friday to zero to 15 below zero and still falling by mid-afternoon

		with brisk west winds creating wind chills of 20 to 40 below zero. Overnight lows Friday night were 15 to 30 below zero with minimum wind chill values of 30 to 45 below zero and it wasn't until Saturday afternoon when actual air temperatures surpassed zero in spots but developing south winds still produced sub-zero wind chills. The last occurrence of something this widespread and intense, although brief was in January 26-27, 1994. Numerous schools and businesses closed as well as outdoor events, including ski resorts.
1/20/2022	1/22/2022	Minimum temperatures Friday morning (1/21) were 5 to 10 below zero and 10 to 20 below zero on Saturday (1/22). Coldest wind chills early Friday morning were 5 to 10 degrees colder.
1/14/2022	1/15/2022	An arctic cold front moved across VT Friday night (1/14) with a strong area of high pressure across south-central Canada building into VT by late Saturday into Sunday delivering sub-zero temperatures Friday night through Sunday morning. Simultaneously, a powerful ocean storm was moving into Newfoundland Canada Friday afternoon that creating brisk north-northwest winds of 15 to 25 mph with higher gusts that combined with the arctic airmass created dangerously cold wind chills of 25 to 40
1/11/2022	1/12/2022	Minimum temperatures on the morning of the 11th (Tuesday) were 0 to 10 below zero with winds creating wind chills in the 15 to 25 below zero range. Daytime highs only reached the single numbers above zero with still sub-zero wind chills. Lows Tuesday night fell below zero early then rose overnight but combined with south winds of 10 to 20 mph still created wind chills in the 10 to 20 below zero range. Arctic high pressure moving from central Canada across the Great Lakes into the northeast on January 11th. Brisk northwest winds of 10 to 20 mph delivered sub-zero air temperatures, that combined created apparent temperatures (wind chill) in the 20 to 35 below zero range across north-central and northeast VT and higher elevations with 15 to 25 below zero elsewhere by daybreak on January 11th. High temperatures on the 11th ranged from single numbers above and below zero with wind chills still in the teens below zero. Low temperatures during the early night of the 11th were sub-zero and began to rise overnight due to a south wind. However, brisk south winds of 15 to 25 mph actually created wind chills in the 10 to 20 below zero range. Numerous school districts closed school and after school activities due to the cold and COVID related complications according to local media.
201/2015	02/28/2015	Record Cold February 2015 for much of Vermont. Many communities witnessing the coldest month since December 1989 or January 1994. The average departure was 13 to 17 degrees below normal. It was a RECORD COLD February for Rutland and Montpelier, 2nd coldest for St. Johnsbury and 3rd coldest in Burlington. ALL-TIME cold months it was

		RECORD COLD for Rutland, 2nd Coldest for Montpelier, 3rd Coldest for St. Johnsbury and 7th Coldest for Burlington. Burlington and St. Johnsbury's records date back into 1890s, while Rutland in the 1910s and Montpelier in the 1940s. Damage to infrastructure, frozen water mains, etc. has totaled at least $1 million.
1/7/2015	1/8/2015	An arctic cold front pushed across Vermont during the afternoon hours of January 7th with plummeting temperatures and brisk, strong winds (15 to 30+ mph) causing dangerously cold wind chills of 25 to 40 degrees below zero during the evening of January 7th into the morning hours of January 8th. These dangerously cold wind chills lead to delayed school openings of 2 hours or cancelled classes on the morning of January 8th. Actual minimum ambient temperatures on the morning of January 8th were 15 to 30 below zero across northern New York. Observed wind chills in the mountains ranged from 40 to 70 below zero
1/14/2009	1/18/2009	An arctic cold front moved across Vermont during the early morning hours of January 14th 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. Daytime maximum temperatures ranged from single digits above and below zero during this stretch while nighttime minimums were 10 to 30 below zero with isolated readings colder than 40 below zero at times. Some observed minimum temperatures for January 15th included: 32 degrees below zero at Island Pond (Essex county), 31 degrees below zero in Canaan (Essex county), 24 degrees below zero at North Troy (Orleans county), Granby and Gallup Mills (Essex county) with 22 degrees below zero at Plainfield and Marshfield (Washington county), 21 degrees below zero at Morrisville (Lamoille county) and 20 degrees below zero at Lyndonville (Caledonia county), Newport (Orleans county) and Waltham (Addison county). Some observed minimum temperatures for January 16th included: 42 degrees below zero in Island Pond (Essex county), 37 below zero in Sutton (Caledonia county), 34 degrees below zero in Walden (Caledonia county), 32 degrees below zero in Gallup Mills (Essex county), 31 degrees below zero in East Berkshire (Franklin county), 30 degrees below zero in Granby (Essex county), Enosburg Falls (Franklin county), and St. Johnsbury (Caledonia county) and 29 degrees below zero at Plainfield and Waitsfield (Washington county) and Bethel (Windsor county). Record cold daily temperatures were set on January 16th for the following sites; Morrisville-Stowe Airport with 32 degrees below zero, St. Johnsbury Fairbanks Museum with 30 degrees below zero, Montpelier-Barre Airport at 26 degrees below zero and Burlington International Airport at 21 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

12/08/2008	12/08/2008	A surface low and associated arctic cold front moved across northern New York and New England on the night of December 7th. This delivered the season's first arctic air mass with temperatures of 5 above to 10 below zero by the morning of December 8th along with brisk northwest winds of 10 to 20 mph with higher gusts at times. Wind chill readings during the early to mid-morning hours of December 8th were 15 to 25 below zero across Vermont.
3/09/2007	3/09/2007	Arctic high pressure settled across New England during the night of the 8th and morning of the 9th with more frigid temperatures, like a few days earlier across Vermont. Morning lows on the 9th were 10 to 34 degrees below zero, which included record lows at the following three sites: Burlington, Montpelier, and St. Johnsbury. Some morning lows on the 9th included: -34 degrees at Island Pond (Essex), -31 degrees at Sutton (Caledonia), -30 degrees at East Haven (Essex), -28 degrees at Gallup Mills (Essex), -26 degrees in Morrisville (Lamoille), -23 degrees in St. Johnsbury (Caledonia) and Bethel (Windsor), -22 degrees in Newport (Orleans) and Montpelier (Washington), -21 degrees in Enosburg Falls (Franklin), -20 degrees in Plainsfield and Waitsfield (Washington), -19 degrees in Hanksville (Chittenden)and Northfield (Washington), -18 degrees in East Albany (Orleans), -17 degrees in Woodstock (Windsor), -16 degrees in New Haven (Addison) and Alburgh (Grand Isle), -15 degrees in Cornwall (Addison), Rutland (Rutland) and at the NWS office in South Burlington (Chittenden).
3/06/2007	3/06/2007	An arctic cold front swept across Vermont during the afternoon and evening of the 5th and delivered frigid temperatures along with blustery winds. Temperatures plummeted to below zero just after midnight on the 6th and were 5 to 20 degrees below zero by dawn. These frigid temperatures, accompanied by winds of 15 to 30 mph created dangerously cold wind chills of 20 to 40 degrees below zero. Brisk winds with temperatures around zero continued through the daylight hours of the 6th with wind chill readings in the 20s to around 30 degrees below zero. The winds subsided after sunset on the 6th, but it remained extremely cold through the morning of the 7th with overnight minimum temperatures of 10 to 30 degrees below zero. Some morning lows on the 6th included: -20 degrees at East Albany (Orleans), -15 degrees at Sutton (Caledonia) and Eden (Lamoille), -12 degrees at Island Pond (Essex), Chelsea (Orange), Newport (Orleans) and Waitsfield (Washington) with -11 degrees at South Lincoln (Addison), Hanksville and Westford (Chittenden), -10 degrees at St. Albans (Franklin), Alburg (Grand Isle) and Danby (Rutland) and -8 degrees in Rochester (Windsor). Some morning lows on the 7th included: - 35 degrees in East Haven and Island Pond (Essex), -32 degrees in Gallup Mills (Essex), -30 degrees in Canaan (Essex), -27 degrees in Morrisville (Lamoille), -25 degrees in Waitsfield (Washington) and Bethel (Windsor), -24 degrees in St. Johnsbury (Caledonia) and Plainfield (Washington), -21 degrees in Sutton (Caledonia), Hanksville (Chittenden), Union Village (Orange), Newport (Orleans), Northfield (Washington) and Rochester (Windsor), -20

		degrees in Cornwall and South Lincoln (Addison), Essex Junction (Chittenden), East Albany (Orleans) and Woodstock (Windsor), - 19 degrees in Alburg (Grand Isle), Rutland (Rutland) and -18 degrees at the NWS office in South Burlington (Chittenden).
1/25/2007	1/26/2007	An arctic cold front moved across Vermont on the 24th and delivered very cold temperatures of zero to 25 degrees below zero by the morning of the 25th. However, on the night of the 25th into the morning of the 26th, a secondary cold front combined with a strengthening area of low pressure near New Brunswick, accounted for the combination of brisk northwest winds of 10 to 15 mph and temperatures 5 to 20 degrees below zero for wind chill readings of 25 to 40 degrees below zero. Some morning lows on the 25th included: -29 degrees in Island Pond (Essex), -21 degrees in Sutton (Caledonia) and Morrisville (Lamoille), -19 degrees in East Haven (Essex), Canaan (Essex) and Enosburg Falls (Franklin), -15 degrees in Greensboro (Orleans), -14 degrees in Montpelier (Washington), East Albany and Newport (Orleans), -10 degrees in Bethel (Windsor), Westford (Chittenden) and Alburgh (Grand Isle). Some morning lows on the 26th included: -20 degrees in Island Pond, East Haven, Canaan (Essex) and Sutton (Caledonia), -16 degrees in East Albany (Orleans), -15 degrees in Montpelier (Washington), -14 degrees in St. Johnsbury (Caledonia) and Eden (Lamoille) with -11 degrees in South Lincoln (Addison), Woodstock (Windsor), Rutland (Rutland) and the NWS office in South Burlington (Chittenden). Northwest winds of 10 to 15 mph created wind chill values of 25 to 40 degrees below zero. The cold wave diminished slightly on the 27th-29th, due to a slight airmass modification and clouds across the region, but it remained some 10 to 20 degrees below normal. However, another arctic front pushed across the area on the 29th with a replenishment of arctic air that brought early morning low temperatures on the 30th of 10 to 30 degrees below zero. Some morning low temperatures on the 30th included -32 degrees at Island Pond (Essex), -27 degrees in Sutton (Caledonia), -25 degrees in East Haven (Essex), -24 degrees in Enosburg Falls (Franklin), -22 degrees in Morrisville (Lamoille) and -18 degrees in Hanksville (Chittenden) and Newport (Orleans).
2/27/2006	2/27/2006	An arctic airmass was entrenched across Vermont during the early morning hours of the 27th. In addition, the pressure gradient between arctic high pressure in central Canada and low pressure in Labrador Canada accounted for brisk winds. The combination of brisk winds and very cold temperatures produced wind chills of 15 to 30 degrees below zero.
2/18/2006	2/19/2006	An arctic airmass moved into Vermont during the night of the 17th and delivered colder air through the 18th. Meanwhile, a strong pressure gradient between the arctic high across the Great Lakes and the departing storm in Newfoundland was creating brisk winds of 10 to 20 mph with higher gusts. The combination resulted in wind chills of 10 to 20 below zero in the Champlain Valley and south central portions of Vermont.

1/15/2006	1/15/2006	An arctic cold front moved across northern Vermont during the early morning of 15th. Record warm temperatures in the 50s on Saturday the 14th, were replaced with temperatures 5 to 15 above on Sunday. Blustery northwest winds 20 to 30 mph with gusts to 40 mph created wind chills of 10 to 25 degrees below zero and an apparent temperature change from Saturday (14th) of 50 to 70 degrees colder.
1/23/2005	1/23/2005	A storm system east of New England combined with high pressure over the Midwestern US resulted in a flow of very cold air and gusty winds.
12/30/1998	12/31/1998	Low pressure moved into the Canadian Maritimes and the associated arctic front moved across the area early Wednesday. Very cold air was ushered in on strong winds. Snow squalls occurred across the area with between 3 and 5 inches falling in the mountains. Mount Mansfield reported 5 inches. In Rutland several mountain roads were blocked for a short period of time.
1/19/1997	1/19/1997	An arctic airmass centered over the Northeast resulted in bitterly cold early morning low temperatures on Sunday, January 19, 1997. A few of the coldest locations were Canaan (Essex) minus 38, Morrisville (Lamoille) minus 36, and Westford (Chittenden minus 29.
1/17/1997	1/17/1997	An outbreak of arctic air resulted in extreme wind chills across much of Vermont. Wind chills frequently ranged from between 30 and 60 below zero.

Extreme Heat History

Per the State Hazard Mitigation Plan, the following extreme heat events occurred:

Date	Event Description & Extent
June 17 - 19, 2024	Areas of Vermont and other states in New England experienced a heatwave with temperatures in the 90s for three day.
June 18, 2020	Areas of Vermont and New York experienced the 2nd longest heatwave duration with temperatures in the 90s for six days straight in northwestern Vermont. Burlington recorded the highest temperature in its history on June 22nd and 23rd with a reading of 96°F. Eight of fourteen of Vermont's counties recorded high temperatures during this period. One death in Orleans County was associated with this heat wave.
July 1, 2018	High temperatures affected all fourteen counties in Vermont through Independence Day. Temperatures reached the mid-90s, and heat indices were recorded within the range of 95 -110°F. The heat wave continued for 6 consecutive days, and Burlington, VT saw the warmest 5 day stretch since 1892. It is important to note that the all-time minimum temperature also broke a previous record of 78 degrees Fahrenheit, on July 2nd, 2018. Four deaths were attributed to this event, one recorded in Washington County and three in Chittenden County, all related to excessive indoor residential temperatures. Nearly 100 heat-related emergency department visits occurred state-wide during this heat wave, and more than 10 percent of Emergency Medical Service calls on July 1st were heat related.
March 17, 2012	Winter of 2011-12 had temperatures that averaged 4-5°F above normal and

	snowfall 40-60% of normal. This combination accounted for snow pack across the region to be largely below normal or even non-existent by mid-March. In Vermont, temperatures climbed to the 70s March 18 and low-80s March 19-22. Record heat was recorded across all of Vermont with maximum temperatures 30-40°F above normal and some daily records being broken by 10°F or more. This event caused an estimated reduction of 30% of maple sugar production, resulting in an estimated impact of nearly $10 million. In addition, there was significant loss of ski industry revenue due to a 25-50% reduction in snow loading.
July 21, 2011	Temperatures across much of southern Vermont warmed into 90s with dew points in the 70s, combined with the hot temperatures and resulted in heat indices of 100°F to 104°F. This was the 2nd day of a 3 to 4-day heat wave across a large portion of Vermont with heat index values of 100°F to 108°F across the Champlain and Connecticut valleys as well as some interior valleys. One death is attributed to this event in Windsor County.
August 1-2, 2006	A heat ridge moved into Vermont during the early morning of August 1. Temperatures soared into the 90s but significantly more important were dewpoints that reached the middle to upper 70s to produce excessive heat index values of 100°F to 105°F, some of the highest values in nearly a decade.

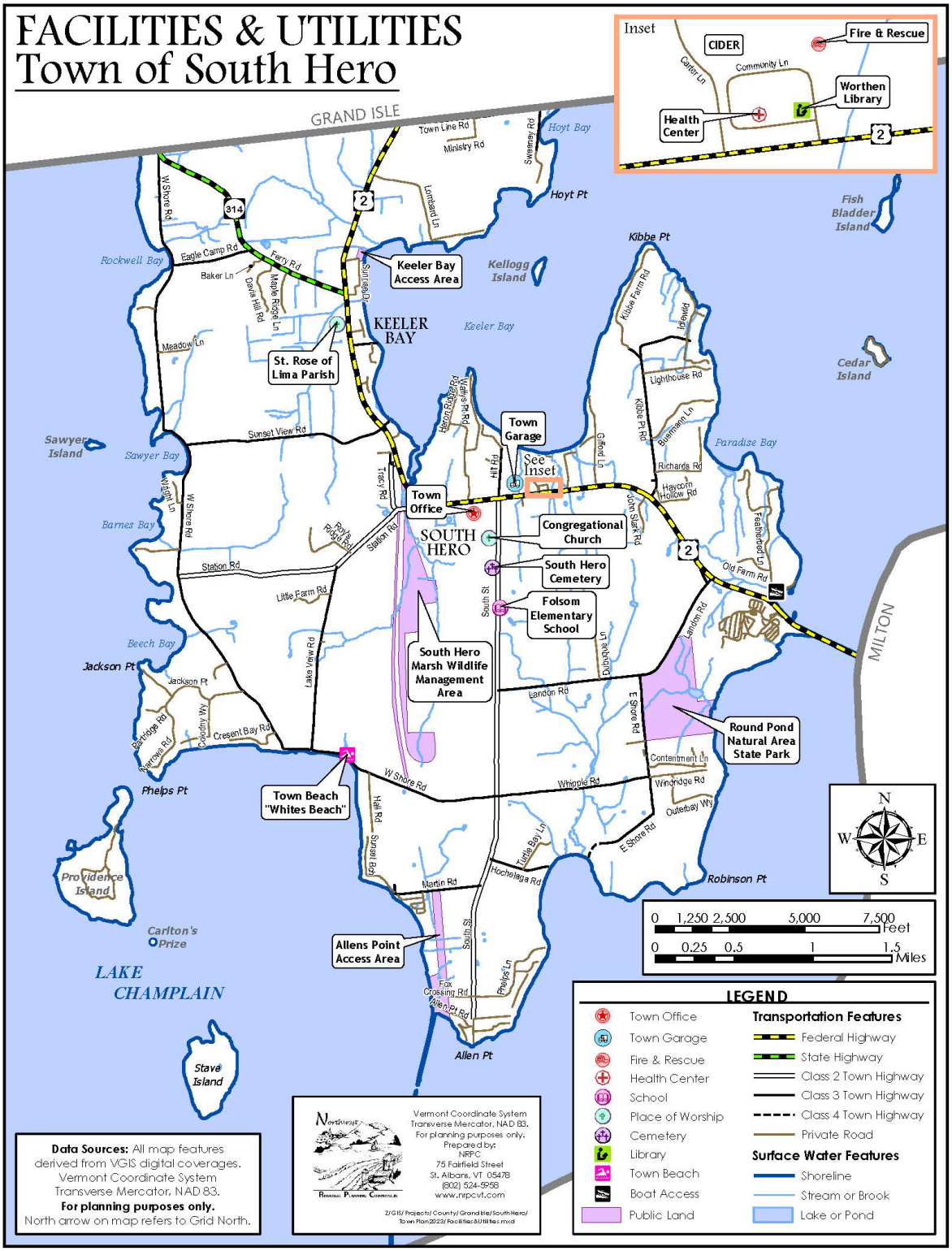
Hail History

Begin Date	End Date	Event Description and Extent
7/21/2010	7/21/2010	Several reports of quarter size diameter hail across South Hero, including South Street where some damage to apple orchards and other crops.
8/16/2007	8/16/2007	Quarter size hail reported by retired NWS employee in Grand Isle.
7/03/2002	7/03/2002	A cold front along the Canadian-United States border triggered locally severe thunderstorms Wednesday night, July 3rd.
7/22/1999	7/22/1999	A large thunderstorm developed during the late afternoon and evening hours over the Green Mountains in Washington County. Large hail, 1 inch in diameter, was reported in North Fayston while hail 1 1/2 inches in diameter was reported in Waitsfield. In Moretown, Vermont hail was reported the size of marbles. Hail was reported at 0.75 in diameter.
8/22/1997	8/22/1997	An unstable atmosphere across the region associated with an upper-level low over the Great Lakes resulted in numerous thunderstorms with reports of some hail. Hail was reported at 0.75 in diameter.
8/03/1997	8/03/1997	During the early morning hours of August 3, 1997, a cold front moved south from Canada into northern Vermont. Thunderstorms with very heavy rain, large hail and deadly lightning moved across the area. A store in Waitsfield, VT was struck by lightning and set on fire with considerable damage.
7/07/1997	7/07/1997	A cold front moved across Vermont during the afternoon and evening of Monday, July 7, 1997. Thunderstorms preceded and accompanied this front with heavy rain and many reports of hail. There were reports of large hail, and damage was reported to cars in Middlebury, due to the hail (1 1/4-inch diameter). There were reports of small hail in Essex (1/2-inch

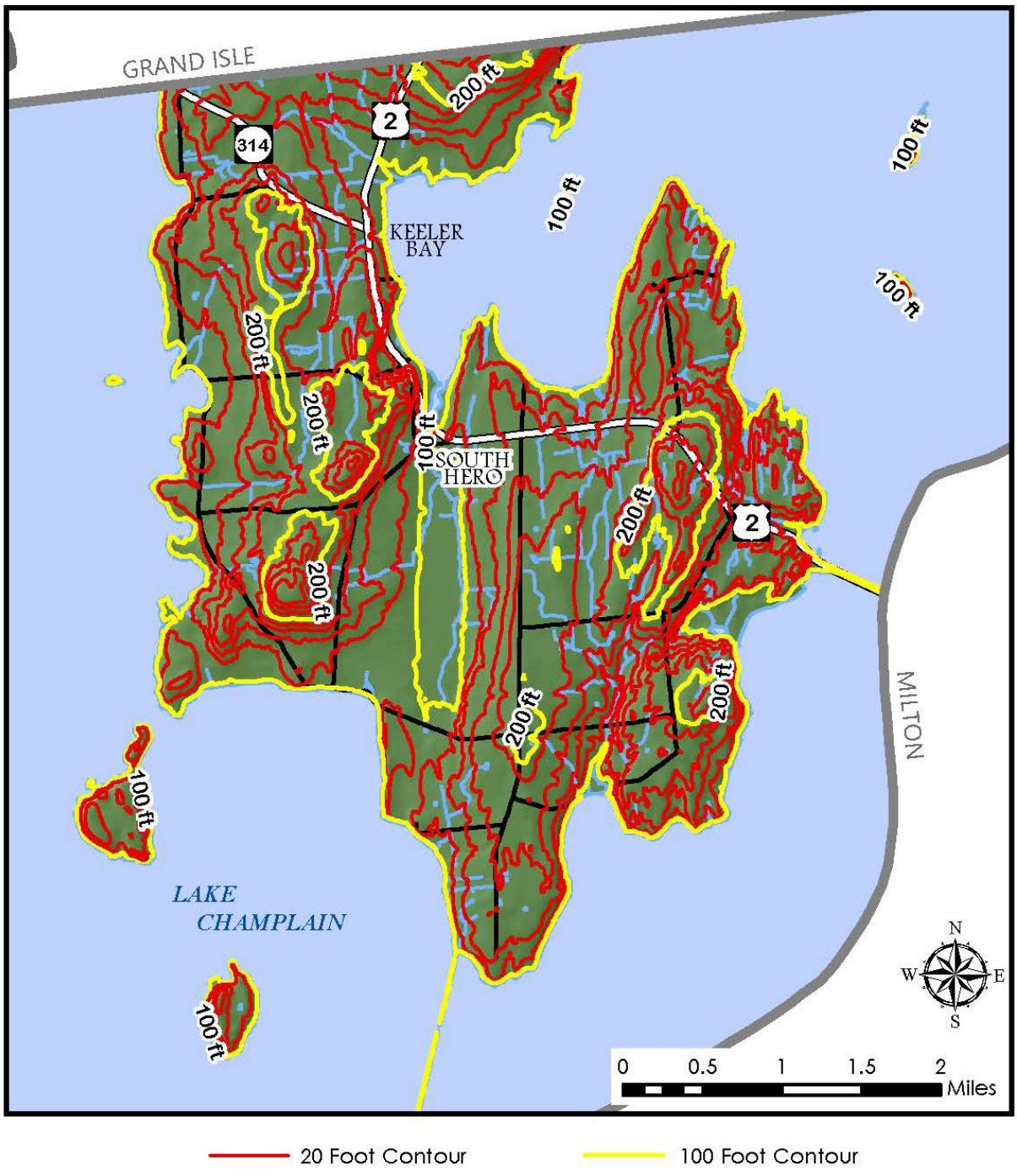
		diameter).
1/7/2015	1/8/2015	An arctic cold front pushed across Vermont during the afternoon hours of January 7th with plummeting temperatures and brisk, strong winds (15 to 30+ mph) causing dangerously cold wind chills of 25 to 40 degrees below zero during the evening of January 7th into the morning hours of January 8th. These dangerously cold wind chills lead to delayed school openings of 2 hours or cancelled classes on the morning of January 8th. Actual minimum ambient temperatures on the morning of January 8th were 15 to 30 below zero across northern New York. Observed wind chills in the mountains ranged from 40 to 70 below zero
1/14/2009	1/18/2009	An arctic cold front moved across Vermont during the early morning hours of January 14th 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. Daytime maximum temperatures ranged from single digits above and below zero during this stretch while nighttime minimums were 10 to 30 below zero with isolated readings colder than 40 below zero at times. Some observed minimum temperatures for January 15th included: 32 degrees below zero at Island Pond (Essex), 31 degrees below zero in Canaan (Essex), 24 degrees below zero at North Troy (Orleans), Granby and Gallup Mills (Essex) with 22 degrees below zero at Plainfield and Marshfield (Washington), 21 degrees below zero at Morrisville (Lamoille) and 20 degrees below zero at Lyndonville (Caledonia), Newport (Orleans) and Waltham (Addison). Some observed minimum temperatures for January 16th included: 42 degrees below zero in Island Pond (Essex), 37 below zero in Sutton (Caledonia), 34 degrees below zero in Walden (Caledonia), 32 degrees below zero in Gallup Mills (Essex), 31 degrees below zero in East Berkshire (Franklin), 30 degrees below zero in Granby (Essex), Enosburg Falls (Franklin), and St. Johnsbury (Caledonia) and 29 degrees below zero at Plainfield and Waitsfield (Washington) and Bethel (Windsor) Record cold daily temperatures were set on January 16th for the following sites; Morrisville-Stowe Airport with 32 degrees below zero, St. Johnsbury Fairbanks Museum with 30 degrees below zero, Montpelier-Barre Airport at 26 degrees below zero and Burlington International Airport at 21 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
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Appendix F: Maps
Facilities & Utilities

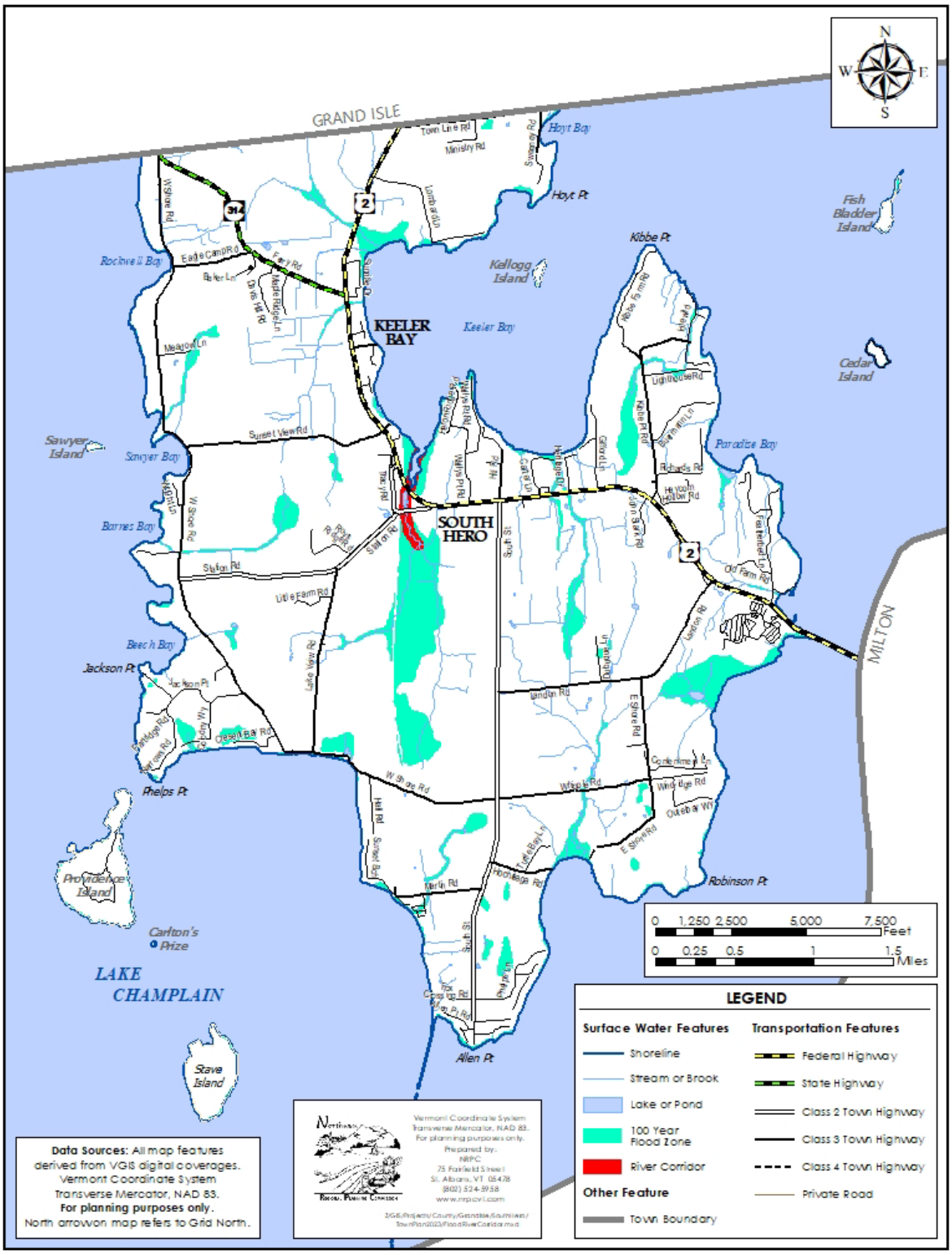


Topography


GRAND ISLE
314
2
KEELER BAY
SOUTH HERO
MILTON
LAKE CHAMPLAIN
200 ft
100 ft
N
W
E
S
0
0.5
1
1.5
2
Miles
20 Foot Contour
100 Foot Contour

Flood Zones and Stream Corridors

(Source: Agency of Natural Resources)



Appendix G: Stakeholder and Public Outreach Plan

TOWN OF SOUTH HERO
LOCAL HAZARD MITIGATION PLAN – STAKEHOLDER AND PUBLIC OUTREACH PLAN

To meet FEMA requirements and to ensure public, neighboring community, local and regional agency input opportunities, the following communication methods are recommended.

Goals:

1. Inclusive Participation and collaboration – Ensure all relevant stakeholders and the public have the opportunity to contribute including people with disabilities and functional access needs. Foster collaboration among all stakeholders.
2. Informed Decision-Making – Provide necessary education and information regarding hazards and risks.
3. Community Buy-In – Foster community support and ownership by involving stakeholders and public from the start.
4. Transparency - Build trust through clear, transparent and consistent communication throughout the planning process
5. Effective Implementation - Gather input that is practical, sustainable and responsive to the needs of the community.
6. Compliance – Ensure federal, state and local requirements for public involvement in hazard mitigation planning are met.

Identifying Planning Team and Stakeholders

- Local Government Officials – Town Administrator, first response agencies, town clerk, finance, zoning administrator, communications, planning, and regional planning commission, Health Department
- School representatives
- Local and regional entities that support persons with disabilities, access, and functional needs (PDAFN) or vulnerable populations (vulnerability specific to hazard mitigation)
  - Hospital / medical care (University of Vermont Medical Center, Champlain Islands Community Health Center
  - Visiting Nurses Association
  - Champlain Valley Office of Economic Opportunity
  - Persons living in flood zones
  - Champlain Islands Developing Essential Resources (C.I.D.E.R.)
  - Public Transportation (C.I.D.E.R.)
- Neighboring communities (Grand Isle, Milton)
- Local and regional agencies that support hazard mitigation / emergency response
  - Northwest Regional Planning Commission
  - Grand Isle Co. Regional Emergency Management Committee
  - Grand Isle Mutual Aid Association, Inc.
  - Grand Isle County Sheriff's Department
  - South Hero Fire Department
  - South Hero Fire District #4
  - South Hero Highway Department

        - South Hero Rescue
    - Businesses that support hazard mitigation / emergency response
        - Champlain Islands Economic Development Corporation
        - Vermont Electric Co-operative
        - Public Transportation (C.I.D.E.R.)
    - Non-Profit organizations – Including community-based organizations that work directly with or provide support to people with disabilities or functional accesses needs or front-line communities – housing, health care, etc.
        - Food Shelf, Healthy Roots Collaborative, Champlain Valley Office of Economic Opportunity, C.I.D.E.R., American Red Cross, Lake Champlain Islands Community Health Center, Meals on Wheels)

Communication Methods and Implementation:

- Post meeting information (agenda, slides, zoom link, etc.) on town website
- Post meeting information (agenda, slides, zoom link, etc.) on town social media sites
- Post Online surveys / questionnaires on village website
- Send email notifications (e.g., meeting dates, agenda, slides, etc.) to planning team and stakeholders
- Post hard copies of meeting information (agenda, slides, etc.) in municipal building (e.g., town office, library, other)
- Post hard copy of meeting information (agenda, slides, etc.) in non-municipal building (e.g., post office, C.I.D.E.R.)

Processing Feedback

Feedback opportunities included public meetings, public comment period, requests. online feedback via email link, phone, regular updates and follow-ups. Comments and feedback received were incorporated during the plan update.

Planning Team and Stakeholders		
Name	**Organization**	**Role**
Sue Arguin	Town Administrator	Planning Team Lead
Dave Carter	South Hero Selectboard Chair/EMD	Planning Team Member
Naomi King	Communications / Town Clerk	Planning Team Member
Kim Julow	South Hero Treasurer	Planning Team Member
Martha Taylor-Varney	Zoning Administrator	Planning Team Member
Patrick Robinson	Chief - South Hero Fire Department	Planning Team Member
John Beaulac	South Hero Road Foreman	Planning Team Member
Shaun Coleman	Northwest Regional Planning Commission	Planning Team Member
Ann Zolotas	South Hero Selectboard Chair	Planning Team Member
Skip Brown	South Hero Selectboard	Planning Team Member
Troy Toth	South Hero Rescue	Stakeholder (First Response)
William Johnson	Vermont Electric Co-op	Stakeholder

		(Electric Utility)
John Bartlet / Amber Baker	Acting Milton Town Co-Managers	Stakeholder (neighboring community)
Ray Allen	Grand Isle Co. Sheriff's Office	Stakeholder (Law Enforcement)
Bill Baron	Grand Isle EMD	Stakeholder (neighboring community)
Adam White	Grand Isle Fire Chief	Stakeholder (neighboring community)
Jacqueline Kelley	EP, Vermont Department of Health, St. Albans District	Stakeholder (Public Health)
Mike Murdock	Chair, Grand Isle County Regional Emergency Management Committee President, Grand Isle County Mutual Aid Association, Inc.	Stakeholder (First Response/Mutual Aid)
Jordan Posner	Champlain Islanders Developing Essential Resources (C.I.D.E.R.)	Stakeholder (Range of Community Services including older adults and people with disabilities and functional access needs)
Jess Graff	Director, Champlain Valley Office of Economic Opportunity (CVOEO)	Stakeholder (People with Disabilities and Functional Access Needs)
Whitney Doremus	Grand Isle Food Shelf	Stakeholder (Food, Water, Shelter)
Ashley Bartley	Visiting Nurses Association	Stakeholder (Senior Healthcare, Hospice and Community Support Services)
Jan Carney	University Of Vermont Medical Center	Stakeholder (Hospital)
Lisa Tourville	Champlain Islands Community Health Center	Stakeholder (non-profit healthcare center)
Julie Pidgeon, Principal Rich Monterosso Chair School Board	Folsom Education and Community Center	Stakeholder (Education)
Terry Robinson	South Hero Historical Society	Stakeholder (Historical)

Outreach Contacts	
Senior Living	Bayview Crossing 10 Carter Lane South Hero, VT 05486 (802)578-6855
Business and Community	Lake Champlain Islands Economic Development Corp 3501 US-2 North Hero, VT 05474
Campground – Special Needs	Camp-Ta-Kum-Ta Sunset View Road South Hero, VT 05486 (802) 372-5863
Community Action	Champlain Valley Office of Economic Opportunity (CVOEO) Director Jess Graff 5 Lemnah Dr., Suite 5 St. Albans, VT 05478 (802) 527-7392
Community Action	Champlain Islanders Developing Essential Resources (C.I.D.E.R.) 12 Carter Lane South Hero, VT 05486 (802)372-6425
Daycare	Champlain Islands Parent Child Center South 114 South St. South Hero, VT 05486 (802)372-4704
Food Shelf	Grand Isle Food Shelf Grand Isle, VT 05458
Government Office	South Hero Town Office 333 US Route 2 South Hero, VT 05486 (802)372-5552
Government Office (neighboring)	Grand Isle Town Office 9 Hyde Road Grand Isle, VT 05458 (802)372-8830
Government Office (neighboring)	Milton Town Office 43 Bombardier Road Milton, VT 05468 (802)893-6655
Health Facility	Champlain Islands Health Center 52 Community Lane South Hero, VT 05486 (802)372-4687
Historical	South Hero Historical Society PO Box 180 South Hero, VT 05486
Hospital	University of Vermont Medical Center

	111 Colchester Avenue Burlington, VT 05401
Library	Worthen Library 28 Community Lane South Hero, VT 05486 (802)372-6209
Municipal Highway Department	South Hero Town Garage 280 US Route 2 South Hero, VT 05486 (802)372-4485
Water – South Hero Fire District#4	Kevin Winch (802) 372-4000
Religious Facility	Congregational Church – South Hero 75 South St, South Hero, VT 05486 (802) 372-6967
Religious Facility	Saint Rose of Lima Parish 501 US Route 2 South Hero, VT 05486 (802)372-4092
RV Park and Marina	Apple Island Resort 71 US Route 2 South Hero, VT 05486 (802)372-3800
Schools	Folsom Education and Community Center 75 South Street South Hero, VT 05486 (802)372-6600

Appendix H: Community Survey Flyer, Survey and Results



Community Stakeholder Survey *
Town of South Hero, Vermont
Local Hazard Mitigation Plan

***Results in Red:** The Town of South Hero utilized a survey to solicit public input on 1) potential natural hazard impacts and 2) mitigation strategies to reduce these impacts in the future. The survey was made available online as well as hard copy over the course of the planning process. The Town received 26 responses and a summary of the input received is provided below in red.

Hazard mitigation is an action that reduces the long-term impacts of Natural Hazards (e.g. ice, snow, wind, heat, cold, drought, flood inundation, fluvial erosion, earthquake, wildfire, invasive species, infectious disease outbreaks, and hail) on that community including people, buildings, environmental systems, and other infrastructure.

Your Name (optional):
Email address (if you would like to be contacted for follow-up information):

Town, Village or City of residence?
South Hero Town: 94.7%
Other: 5.3%

Have you ever experienced a natural disaster? If so, what type and where?
Yes: 82.4% (Various locations and dates, including ice storms, floods, wind damage)
No: 17.6%
No answer: 0%

Is your home or business property located in a FEMA designated floodplain?
If yes, do you have insurance through the National Flood Insurance Program (NFIP)?
Yes: 0%
No: 89.5%
Do not know: 10.5%.

Please select the <u>three</u> hazards you think pose the *greatest concern* to your community.
Flooding: 5.3%
Severe Winter Storm (Ice Storm): 5.3%
Severe Wind: 10.5%
Lakeshore and Fluvial Erosion: 5.3%
Severe Thunderstorm: 5.3%
Infectious Disease Outbreak: 15.8%
Invasive Species: 5.3%
Cold: 5.3%
Drought: 0%
Heat: 0%
Wildfire: 5.3%

Is there another hazard not listed above that you think is a wide-scale threat to the community? If yes, please explain.

- Poison parsnip.

Please explain why you think these hazards pose the greatest risk to the community or you in particular.

High Winds, Falling Trees and Infrastructure Damage

- Many noted that high wind events frequently bring down trees and power lines, resulting in multi-day power outages.
- Fallen trees often block roads and driveways, trapping residents and obstructing emergency vehicles or access to essential services.
- Residents along or near Lake Champlain highlighted that strong winds hitting open water exacerbate property and tree damage.

. Ice Storms and Severe Winter Conditions

- Ice storms are perceived as particularly dangerous due to their ability to freeze infrastructure solid, causing extended grid failures during dangerously cold weather.
- Access & Mobility: Unplowed, icy, or tree-blocked roads severely limit emergency response times and isolate households.

3. Flooding, Lake Shore Erosion, and Water Quality

- Respondents expressed concern over rising lake levels during heavy rain/thaw events, leading to severe shoreline erosion and localized road flooding.
- Property Access: Flooded access roads prevent residents from entering or exiting their properties.
- Excessive runoff and flooding contribute to lake pollution and water quality degradation (Keeler Bay).

4. Isolation and Community Vulnerability

- Being on an island community creates inherent logistics challenges. Disrupted power lines or blocked primary arterial roads can easily cut the town off from major medical services and regional aid.
- Prolonged outages pose direct threats to home heating systems, refrigeration, and medical equipment during extreme weather.

What do you think the community's disaster resiliency priorities are?

89% responded. Summary of responses:

- Upgrading and protecting electrical infrastructure against severe wind, ice, and tree strikes.
- Ensuring backup generator capability for critical municipal facilities, shelters, and vital services during prolonged outages.
- Prioritizing prompt snow removal, debris clearing, and flood prevention on primary corridors to prevent neighborhoods from becoming isolated.
- Trimming and removing high-risk trees and branches along power corridors and public roads before storm events occur.
- Improving real-time notification systems to reach residents quickly before, during, and after severe weather events.
- Establishing clear protocols and check-in procedures for elderly residents, isolated households, and individuals requiring medical assistance during extended power or heat loss.

- Improving stormwater systems and culverts to manage heavy runoff and prevent localized road washouts.
- Stabilizing vulnerable shoreline areas against lake-level fluctuations and wave action.

What types of mitigation project do you believe local, state and federal government agencies should focus on to reduce disruptions of services and strengthen the community?

100% responded. Summary of residents recommended actions for the town:

Retrofit and strengthen essential facilities such as the public works, electric department, public safety, municipal office, schools, etc. - 63.2% -
Replace inadequate or vulnerable bridges and culverts – 89.5%.
Retrofit infrastructure by, for example, elevating roadways and improving drainage systems – 47.4%.
Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.) – 42.1%.
Install or improve protective structures, such as floodwalls, levees or overflow facilities – 0%.
Buyout flood prone properties and maintain as open space – 5.3%.
Strengthen codes, ordinances and plans to require higher hazard risk management standards – 5.3%.
Inform property owners of ways they can mitigate damage to their property(s) – 15.8%.
Improve local emergency shelter facilities – 5.3%.
Other:
transition to green energy – 5.3%
Tree trimming along utility corridors – 5.3%.

How would you rate the importance of the following actions to protect yourself and your community:
(1= Most important 5= Least important)

Priorities	Actions	Most Important	Very Important
High	Preventing loss of life and injuries	79%	5%
	Protecting transportation infrastructure (roads/bridges)	63%	11%
	Protecting and reducing damage to utility infrastructure (power/water/water/wastewater)	58%	21%
Medium	Promoting cooperation among public agencies, citizens, non-profits, and businesses	42%	27%
	Strengthening emergency services (police, fire, ambulance)	42%	26%
	Protecting the natural environment	26%	26%
Low	Preventing business closure and loss	21%	11%
	Protecting historical/cultural landmarks	21%	5%
	Protecting private property	16%	21%

Where do you turn for information during an emergency? (circle all that apply)

- Cell phone: 84.2%
- Front Porch Forum: 5.3%
- Land Line Phone: 0%
- Newspaper: 5.3%
- Radio Station: 68.4%
- Social media (Instagram, Facebook/Meta, X (Twitter), other) 89.5%
- Television 89.5%
- VT Alert: 10.5%
- Weather Radio: 5.3%

What actions have you taken to reduce the risk to your residence and family from potential natural disasters?

(Circle all that apply)

- Developed a family plan: 21%.
- Have a 3-day supply kit: 32%.
- Have a car emergency kit: 58%.
- Certified in First Aid and/or CPR: 32%
- Installed smoke detectors: 79%.
- Installed carbon monoxide detectors: 68%.
- Installed a generator and know the utility shutoff procedure: 16%.
- Purchased fire extinguishers: 68%.
- Installed Floodproofing: 0%
- Purchased flood insurance: 5%.
- Purchase homeowners'/renter's insurance: 95%.
- Other: 0%

Thank You for your Input!

If you have questions or would like additional information, please contact **Shaun Coleman, Northwest Regional Planning Commission at** scoleman@nrpcvt.com or (802) 524-5958.