

FLOOD RESILIENCE

Flood Risks in Hardwick

In Hardwick, flooding occurs when too much rain is delivered too quickly or for too long a period which causes the streams and rivers to overflow their banks. The Lamoille River quickly becomes a rushing torrent in the hours after a particularly large thunderstorm or after several days of slow, steady rain. If the river is already “running high” due to the melting of the winter’s snowpack, the effect of these rainfall events are even more dramatic.

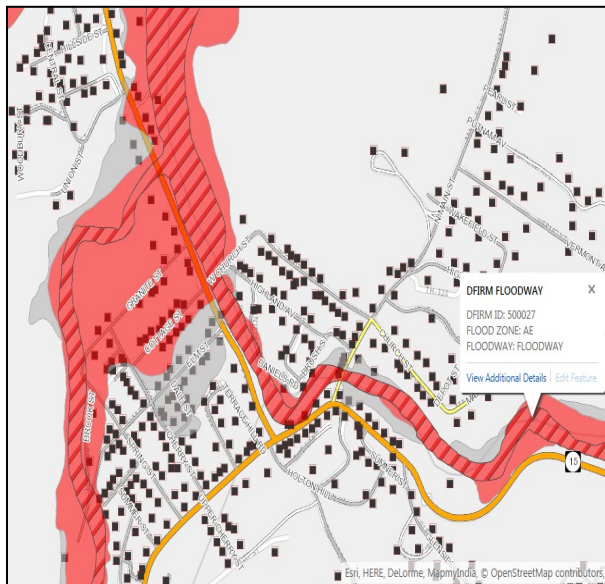
Additionally, if large sheets of ice or woody debris are “floated” by this rising water, they can form ice-jams or debris-dams at sites where the river is constricted by a sharp bend or a bridge. The damage to built structures caused by being submerged by water and/or rammed by icesheets/trees can be enormous. Also, there is the increased risk to human life and property due to these road closures because this impairs the response of fire and rescue emergency vehicles. The best way to deal with flooding in Hardwick is to attempt to prevent as many of these events from happening as possible, or at least to try to reduce the damage they now can produce.



Long Reach Breaks Up Ice Jam in Hardwick
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FEMA Digital Flood Insurance Rate Maps (DFIRMS)

To identify a community's flood risk, FEMA uses data to create the flood hazard maps (DFIRMs) that outline your community's different flood risk areas. Some parts of floodplains



may experience frequent flooding while others are only affected by severe storms. However, areas directly outside of these high-risk areas may also find themselves at considerable risk. It has been 40 years since the Effective Date for the FIRM’s for Caledonia County but updates are currently in process and are expected to be complete by 2021. The Flood Insurance Rate Map for Hardwick dates to 1984 and received minor updates in 1987 and in 2002.

The Cost of Flooding to Hardwick

Many people think that if they do not live near a river or the coast, they are not in danger of flooding, giving them a false sense of security. Floods are the number one natural disaster in the United States and in a high-risk area; your home is more likely to be damaged by flood than by fire. Presently, Hardwick has 29 flood insurance policies in the Special Flood Hazard Area. FloodReadyVermont.gov estimates that 96 buildings are located in the Special Flood Hazard area.

Hardwick Flood map data: Close-up of FIRM for Downtown Hardwick

The Lay of the Land & Flood Damage Risk

The Town of Hardwick is situated in an area where the landscape greatly controls where buildings, roads, and agriculture can occur, and thus both creates a large risk of flood damage while also limiting the options for flood mitigation. The majority of Hardwick is relatively gently-sloped land lying at elevations between 1000 and 1500 feet. This surface is incised by three major river valleys; Lamoille River (east-west), Alder Brook (north-south), and Cooper Brook (south-north). Agricultural fields are confined to the “flatter” area away from these rivers, as well to the wider portions of the level floodplains alongside them, with the remaining areas of town being forested. The highways and many roads follow the river valleys and their tributaries as seen by Route 16 and much of Route 15 bordering the Lamoille River and by Route 14 traveling alongside Alder Brook, the Lamoille River, and Cooper Brook.

Culverts & Bridges

The combination of roads, steep slopes, and running water not only constitute areas of higher Road Erosion risk, it also often marks areas where the Town of Hardwick has installed and maintains culverts and bridges. The VTCulverts.org database shows that Hardwick has 478 culverts, with the majority found to be in fair to poor to good condition. The two critical culverts are on Porter Brook Road and Scott Road. The “urgent” culvert is on Brown Farm Road.

Table 1: Hardwick Highway Culvert Conditions (2019)

Excellent	6
Good	219
Fair	192
Poor	55
Critical	2
Urgent	1
Unknown	3

Source: VTCulverts.org

Hardwick maintains 26 bridge structures according to the VTCulverts.org database. Eleven bridges are indicated to be in good condition, 9 are in unknown condition, and 5 are in fair condition. The bridge which spans Tucker Brook Road is the only bridge listed as being in poor condition.

Critical Facilities

Critical facilities are essential to a community’s resilience and sustainability. Because they are defined by their ability to quickly and efficiently respond to and recover from floods, critical facilities should never be flooded, and their critical actions should never be conducted in floodplains if at all avoidable. Hardwick has two critical facilities in the Special Flood Hazard Area – the fire station and the Hardwick Electric garage. The town should consider a full range of options to mitigate risk to these structures in the future in order to ensure continuity of services during a disaster.

Goals, Policies, & Recommendations

GOAL

- To encourage a flood-resilient community.

POLICIES

- New development in identified flood hazard, fluvial erosion, and river corridor protection areas should be avoided. If new development is to be built in such areas, it should not exacerbate flooding and fluvial erosion.
- Flood plains and upland forested areas that attenuate and moderate flooding and fluvial erosion should be protected and restored.
- Flood emergency preparedness and response planning should be encouraged.

ACTIONS & RECOMMENDATIONS FOR IMPLEMENTATION

- Maintain and regularly update the Local Emergency Operations Plan.
- Continue to meet the VTrans Road and Bridge standards. Encourage participation in regional road foreman trainings and Transportation Advisory Committee meetings.
- Attempt to achieve yearly updating of the Town's transportation infrastructure information in the Vermont Online Bridge and Culvert Inventory Tool.
- Identify and replace undersized and failing culverts.
- Relocate the Fire Station and HED garage out of the floodplain or flood proof these structures to 500-year flood standards.
- Maintain and regularly update the Local Hazard Mitigation Plan.