

Considerations of Flood-Related Elements for East Montpelier LHMP
8/15/19 Ned Swanberg, VT DEC

Hello Bruce Johnson and LHMP Planners,

Thank you for welcoming some thoughts about East Montpelier's draft LHMP. I know there may be a bit of a hiatus with the East Montpelier process until CVRPC identifies a new planner to work your community – but maybe this can be of use.

I will follow up with a copy of the draft and various loose suggestions as “comments”.

Below is a more substantial suggestion about how to articulate the flooding-related hazards (across Vermont) with some of the possible information that you might include specifically in East Montpelier.

The primary impetus here is that erosion-caused damage is far and away the biggest issue in Vermont, I don't think that most LHMP plans articulate the problem clearly and may miss the important opportunities for mitigation. Also, because East Montpelier has already adopted River Corridor protections, I think the town's LHMP could speak more unambiguously about how River Corridor protection fits into the picture.

River Corridor protection is a statewide goal in the Vermont Hazard Mitigation Plan and in statute. However, many of the Town-level templates in circulation could use shed more light on the topic. Perhaps the general approach below could be a start toward that and a model for others?

Flood Hazards

- 1. Erosion Damage**
- 2. Floodplains**
- 3. Stormwater**
- 4. Dams**

1. Erosion Damage

Most of the damage from natural events in Vermont is due to the erosive power of water. This is primarily in the form of damage to public roads, culverts and bridges. Communities can reduce damage through actions including River Corridor protection, upsizing culverts, implementing the MRGP, adopting Low Impact Development standards and restoring floodplain functions.

Construction near streams and rivers is often too close. When improved property near stream channels gets protected by armoring it often straightens the channel and increases the erosive power of high water. River Corridor protection provides room for the channel to adjust and avoids increasing the erosion and flood risk to neighboring properties and critical public infrastructure.

High water events on small streams are often called “flash floods” and cause considerable damage through erosion. Small streams are often artificially confined and steepened by roads. Further encroachments toward the channel may eliminate the few remaining places for lateral adjustments and floodplain functions. Flash flood hazards on high gradient streams are seldom mapped on the Flood Insurance Rate Map.

Where steep streams drop abruptly into a larger valley, they may rapidly deposit sediments including sand, gravel, and boulders. The hazards associated with these alluvial fans and depositional environments can be difficult to manage.

Protecting the “room needed by the river” is a statewide hazard mitigation priority. River corridors identify the room needed by the stream or river channel to develop and maintain its least erosive slope in the valley. When functional river corridors are not protected, and the area becomes developed, the channel becomes increasingly straightened, erosive and damaging; and delivers more flood water downstream faster.

River Corridor protection is a statewide goal, required in Act 250, the Flood Hazard Area and River Corridor Rule and many municipal permits. Communities adopting no adverse impact regulations for River Corridors can benefit from the highest level of Emergency Relief and Assistance Funds after federally declared disasters.

By protecting River Corridors and floodplain functions through no adverse impact standards the community does not knowingly and directly put new structures and people at risk, establishes clear guidance for new development, accommodates a process that reduces damage from erosion and inundation for structures and infrastructure already at risk, and establishes the foundation for successful site specific mitigation actions.

East Montpelier adopted River Corridor Protections in 2015. Additionally, East Montpelier requires 25 feet of vegetated buffers on stream banks helping to protect bank stability and other co-benefits.

River Corridor and floodplain restoration opportunities are identified under R22-R-24 of Table 8 of the [Upper Winooski River: Plainfield to Montpelier, River Corridor Plan](#) (2010). Sites noted include:

- Coburn Covered Bridge
- Restoring riparian buffers
- Removing berms in two locations
- Improving State Route 2 bridge – Vtrans

The Plan also identifies stream crossing structures that are undersized, have hazardous orientations or might additionally qualify for funding through Fish and Wildlife. The Vermont DEC Stream Geomorphic Assessment data is online as [Winooski, Montpelier. to Cabot Bridge / Culvert Reports](#)

[The Vermont Culvert Geomorphic Compatibility Screening Tool](#) February 2008 describes the assessment method and the compatibility score. A low score is less compatible.

Selection of Impaired Culverts Based on Low Compatibility Score and Low AOP Score

| Priority Culverts | Compatibility Sum | AOP Course Screen | Location | Bankfull Width Percent | Ice Debris Jam | Openness Ratio | Outflanking | Poor Location |
|-------------------|-------------------|-------------------|---|------------------------|----------------|----------------|-------------|---------------|
| 1 | 11 | Orange | Structure located on Snow Hill Road between Old Trail Road & Putnam Road | 40.3 | 1 | 2.53 | 1 | 1 |
| 2 | 11 | Red | @ intersection with Sanders circle road TH 19 | 57.7 | 1 | 0.85 | 1 | 1 |
| 3 | 11 | Red | 0.1 mi south of Haggett Rd | 59.2 | 1 | 0.23 | 1 | 1 |
| 4 | 12 | Red | Approx 3/10 mile south of Junction RT 14 & US 2 | 36.5 | 1 | 0.39 | 1 | 1 |
| 5 | 12 | Gray | Just upstream of the Route 2 Mallory Brook culvert Structure # 300028007112071 | 47.9 | 1 | 2.42 | 1 | 0 |
| 6 | 12 | Gray | 400 ft northeast of Fontaine Ln | 52.6 | 1 | 0.17 | 1 | 1 |
| 7 | 12 | Gray | intersection of Towne Hill Rd with Bliss Rd | 58.8 | 1 | 0.27 | 1 | 0 |
| 8 | 12 | Gray | 500 ft south of Fassett Rd | 61.5 | 1 | 0.24 | 1 | 0 |
| 9 | 12 | Red | 0.5 mi south of Easter Rd | 85.7 | 1 | 0.26 | 1 | 1 |
| 10 | 13 | Gray | Elevation - 765 | 41.2 | 1 | 1.26 | 1 | 1 |
| 11 | 13 | Red | .25 mi east of Vincent Flats Rd | 44.4 | 1 | 0.07 | 1 | 0 |
| 12 | 13 | Orange | along Murray Rd, just over the Montpelier/East Montpelier border | 46.5 | 1 | 0.54 | 1 | 0 |
| 13 | 13 | Red | @ BM 695 | 48.1 | 1 | 1.25 | 1 | 0 |
| 14 | 14 | Red | .25 mi north of US-2 | 31.3 | 1 | 0.02 | 1 | 0 |

2. Floodplains – Special Flood Hazard Areas

Special Flood Hazard Areas in East Montpelier are mapped along the Winooski River, Bennett Brook, Kingsbury Branch, Mallory Brook, Sodom Pond Brook, Long Meadow Brook near Wrightsville Reservoir, and several locations near ponds and wetlands. The detailed flood study on the mainstem of the Winooski River was published in 1983. The Digital Flood Insurance Rate Map of 3/19/2013 incorporated the existing data.

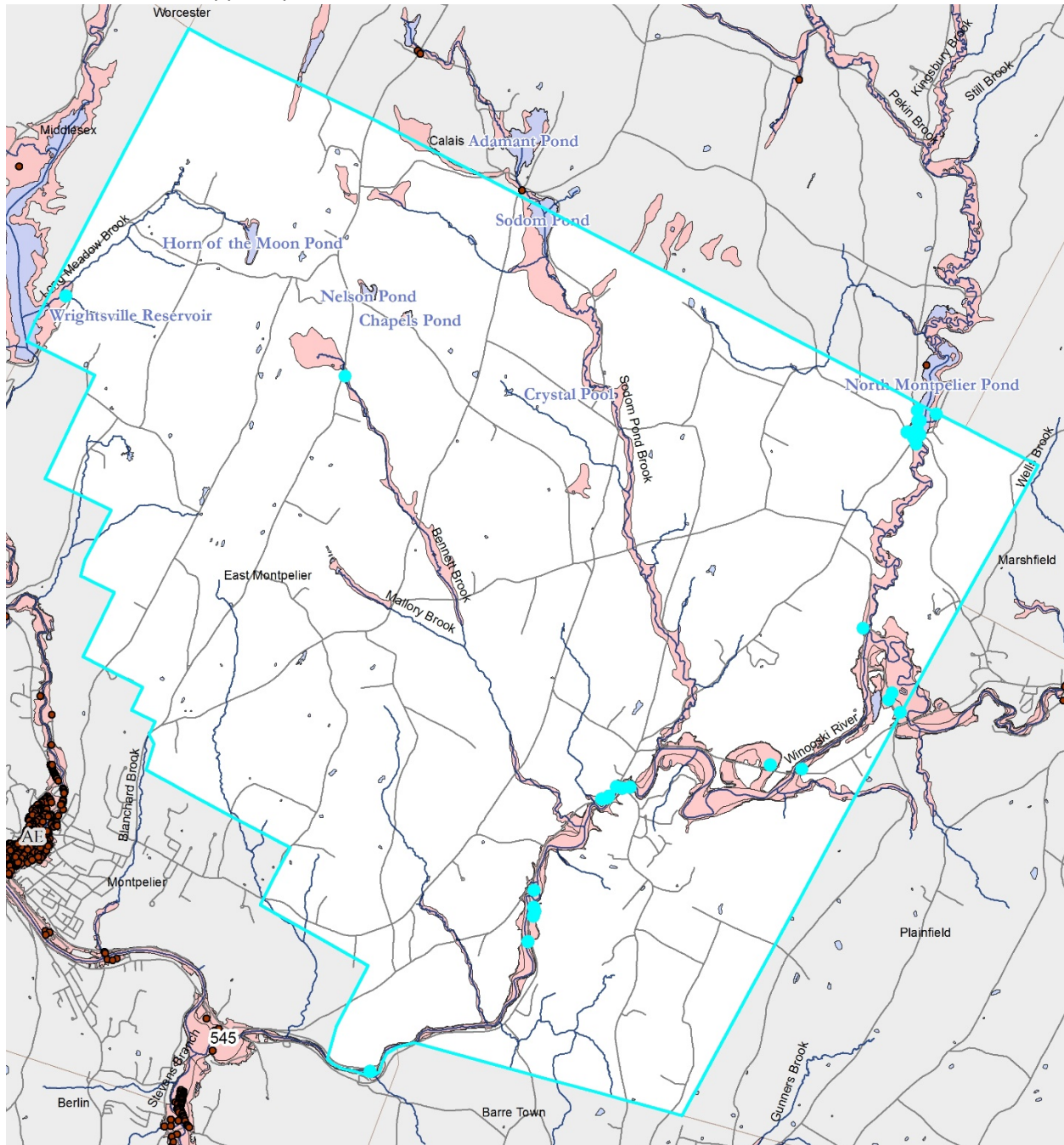
According to the [East Montpelier Community Report](#) on Flood Ready, the community has approximately 33 buildings within the Flood Hazard Area, roughly three percent of all structures in town. This is likely an undercount.

| E911 Points in SFHA | Count |
|----------------------------|--------------|
| SINGLE FAMILY DWELLING | 19 |
| COMMERCIAL | 6 |
| MULTI-FAMILY DWELLING | 3 |
| OTHER | 2 |
| GOVERNMENT | 1 |
| INDUSTRIAL | 1 |
| MOBILE HOME | 1 |
| | 33 |

Approximately 70% of the buildings in the high-risk area are “self-insured” meaning they do not have flood insurance policies in force.

Any building in the SFHA may be eligible for acquisition through FEMA’s Hazard Mitigation Assistance program.

Structures in the Mapped Special Flood Hazard Areas:



Floodway

Several structures including at least three single-family homes, a mobile home and a commercial building are within the Floodway portion of the SFHA. The Floodway is an area characterized by more frequent and higher velocity floodwater.

One action opportunity is to further refine the structure risk information with use of the new one-foot contours from lidar and Elevation Certificates where available. Structures with basements in the SFHA face particularly high levels of risk from inundation. Other factors including exposure to erosion

hazards, and opportunities for co-benefits including floodplain restoration and public access should be assessed.

Another follow up opportunity is to reach out directly to the owners of vulnerable buildings to be sure they are informed regarding hazard area constraints and mitigation opportunities.

3. Stormwater

Low Impact Development (LID) standards are intended to avoid increasing stormwater discharges from new impervious surfaces, notably roofs, driveways and parking areas.

East Montpelier has adopted LID standards as a component of subdivision regulations.

4. Dams

East Montpelier has eight dams in Town. The Town is downstream of Marshfield No. 6, a high hazard dam at Molly's Pond.

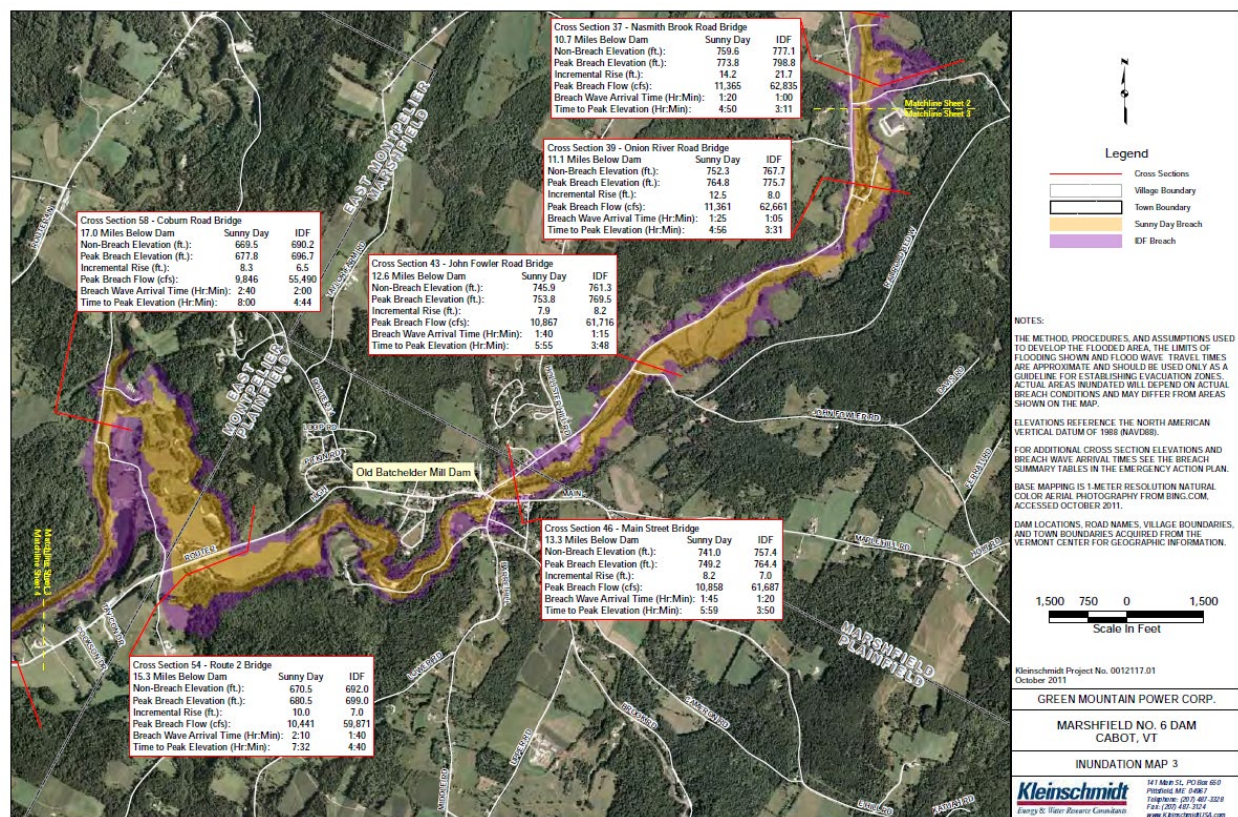
| Dam Name | Stream |
|-----------------------|---------------------|
| Bennett Brook | Bennett Brook |
| Chapels Pond | Sodom Pond Brook-TR |
| Crystal Pool | Sodom Pond Brook |
| Montpelier No. 4 | Winooski River |
| Montpelier No. 5 | Winooski River |
| Nelson Pond | Sodom Pond Brook-TR |
| North Montpelier Pond | Kingsbury Branch |
| Pazini | Kingsbury Branch-TR |

Montpelier Dam No. 4 is on the Winooski at the southern edge of town.

Upstream of East Montpelier, the Marshfield No. 6 dam on Molly's Pond is considered a high hazard dam due to the presence of structures (including 42 in East Montpelier), that could be affected in the unlikely event of a dam breach.

An Emergency Action Plan was completed in October 2011. The dam owner, Green Mountain Power is responsible for notifications during times of concern. The Vermont State Police have the responsibility of coordinating efforts of all governmental and private organizations as would be necessary to respond to and coordinate actions for an impending or actual failure of the Marshfield No. 6 dam.

During a dam failure under high water conditions (Inflow Design Flood) the breach wave would arrive in East Montpelier 2.5 hours after the breach formation and would peak another 6 to 7 hours later. The peak flow rates would be only slightly less than those in Plainfield (~60,000 cfs), which would be in the range of 2 to 2.5 times the 500-year flow.



Current regulations in East Montpelier prohibit new structures in the SFHA and River Corridor. This area includes much of the area inundated by the potential IDF event.

[Living With Dams: Know Your Risks FEMA P-956](#) / February 2013 [E-book version](#)

Other possible concerns:

5. Ice Jams

The USACE CRREL [Ice Jam Database](#) does not have recent records of ice jams in East Montpelier.

6. Landslide Risk

Landslide data in Washington Co.

<https://dec.vermont.gov/geological-survey/hazards/landslides>

<http://anrgeodata.vermont.gov/datasets/landslides>

7. Earthquake and Multi-Hazard Analysis

VGS

<https://dec.vermont.gov/sites/dec/files/geo/HazDocs/WashingtonCountyNESECRpt.pdf>

8. Drought

<https://water.usgs.gov/ogw/drought/>

https://www.usgs.gov/special-topic/water-science-school/science/droughts-things-know?qt-science_center_objects=0#qt-science_center_objects

<https://groundwaterwatch.usgs.gov/NetMapT1L2.asp?sc=50&ncd=rtn>

<https://maps.waterdata.usgs.gov/mapper/index.html?state=vt>

<https://waterdata.usgs.gov/vt/nwis/rt> Streamflow

<https://waterdata.usgs.gov/vt/nwis/nwis>