

Natural Hazard Mitigation and Climate Adaptation Plan



*Town of Clarksburg
May 12, 2021*

What is Hazard Mitigation?

- Natural hazards pose a risk to people, property and the environment
- Examples: floods, hurricanes, tornadoes, drought, heat waves
- Identify activities that can be done to mitigate the hazards before they occur
- Mitigation: pro-active, rather than reactive; action taken to solve a problem on a permanent, long-term basis
- Mitigation Plan is a requirement for eligibility for some FEMA funds
- Updating Plan – Clarksburg was part of the Berkshire Regional Hazard Mitigation Plan of 2012

What Risks Are We Evaluating?

Hazards Evaluated
Flooding (incl. Dam Failure, Ice Jam, Beaver Activity)
Severe Winter Events (Ice Storm, Blizzard, Nor'easter)
Hurricane & Tropical Storm
High Wind & Thunderstorm
Drought
Invasive Species / Pests / Vector-borne Diseases
Wildfire
Annual & Extreme Temperature Changes
Landslide
Tornado
Earthquake

Will Climate Change Effect Hazards and Human Health?

Already we see altered weather patterns:

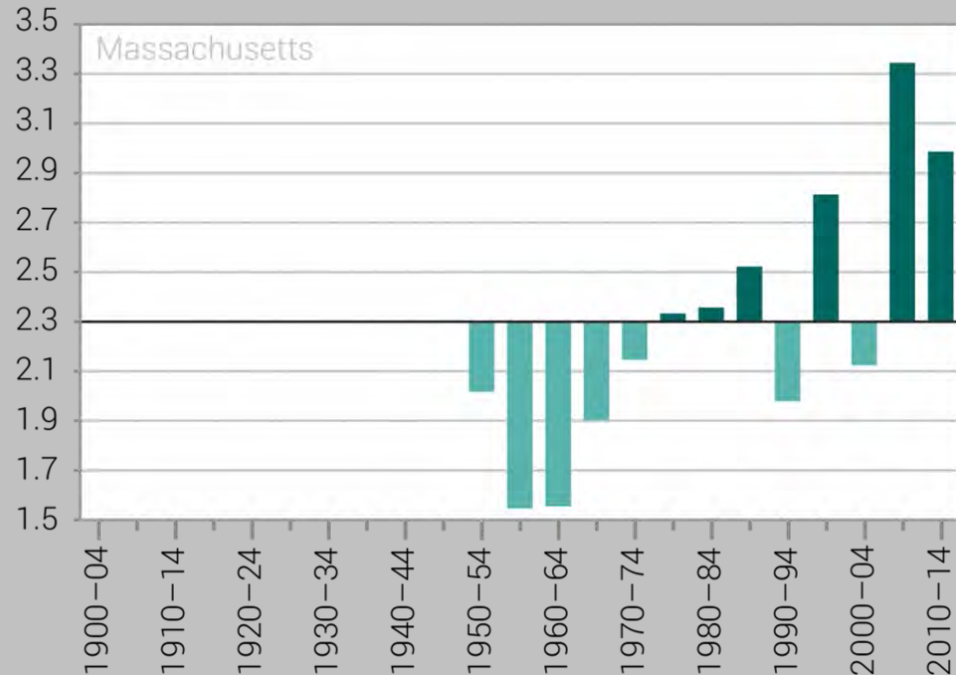
- More frequent and more intense precipitation; damages and repairs more costly
- Longer growing season, more airborne allergens
- More heat waves (>90°F); more in spring and fall
- Warmer winters with heavier snow and more ice
- Higher survival rates for pests (ticks, mosquitos, forest pests)
- Increased risk for algae blooms on lakes/ponds (recent ex. = Stockbridge, Pittsfield)



Observed Number of Extreme Precipitation Events

- 55% increase 1958-2016 in rain/snow ranked top 1% of daily events
- 55% increase in extreme precipitation includes 9-year drought
- ~30% increase in precipitation events $>2''$ in 1 day (see right)
- $>2''$ /day often = flooding, especially if rain on snow/frozen ground

Number of Events w/ Precipitation $>2''$ in 1 day



Observed Number of Warm Nights

Projected In Hudson Watershed:

- Day temps. $>90^{\circ}\text{F}$ increase from 1 per yr. to 9 by 2050s
- Increase to 18 by 2090s**

Observed In MA:

- Number of nights where minimum temp. $>70^{\circ}\text{F}$ increases in MA*

Seniors and those with medical conditions more vulnerable to heat and humidity



* <https://statesummaries.ncics.org/ma>

** MA Climate Change Clearinghouse

Winter Weather Changes

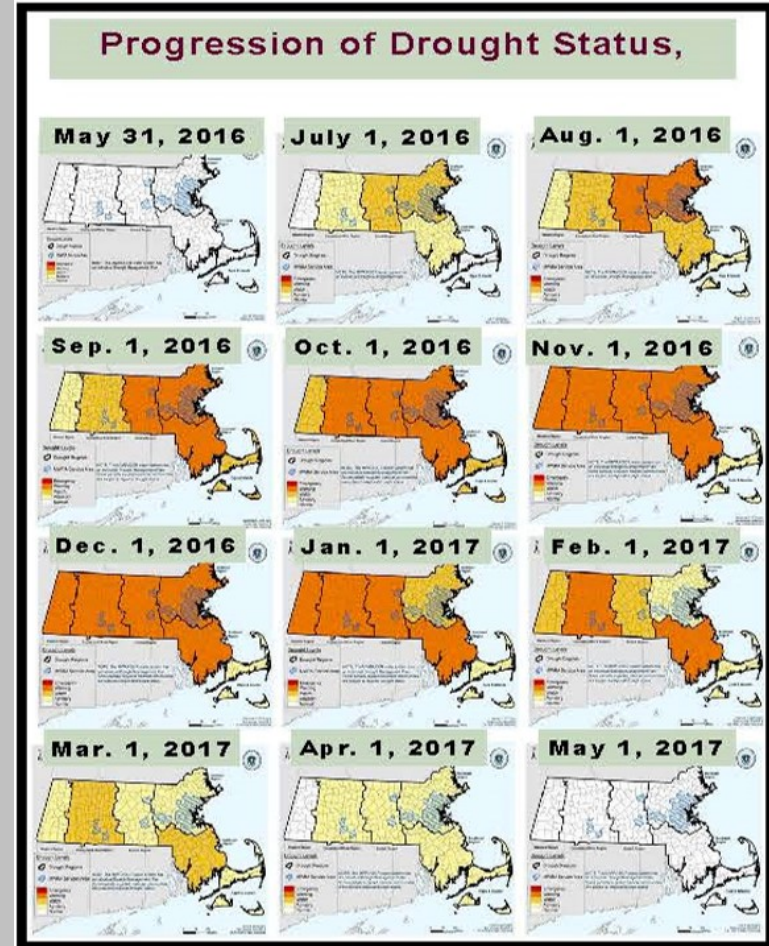
Cycles of cold and warm will increase, alter risks

- **Warmer temps:**
 - **More rain-on-snow events** = Increased runoff, risk of winter floods and ice jams
 - **More Ice Storms** = 2008: >1 million w/out power
 - **Less snowpack** = **less groundwater recharge** = lower baseflow in streams, rivers, reservoirs
 - **Loss of snow insulation** = risk of freeze/thaw = increased risk of frozen pipes, drains
 - **Dryer spring soils**



Don't take Water for Granted

- Drought cycles due to increased temperatures and evaporation
- Lower groundwater recharge
- More water in summer/fall in extreme storm events with higher, earlier peak flows and more runoff
- Berkshires got off lightly 2016-17



Clarksburg Forest Fire April 2015

- 272 acres burned – most in county
- 376 firemen fought the fire over 3 days
- Good News: no buildings nearby
- Bad News: inaccessible to trucks, tankers
- Experience gained



T.S. Irene 2011

- 3"-9" in 12-hour period + high winds
- 100+ year flood in Hoosic River
- 500,000+ MA residents w/out electricity
- Dubbed the “costliest Category 1 storm” (\$15.8 billion in damages in US)
- \$35 million in damages in Berk. Co.; \$23 million alone for Mohawk Trail
- Closure of The Spruces in Williamstown



T.S. Irene 2011 in Clarksburg

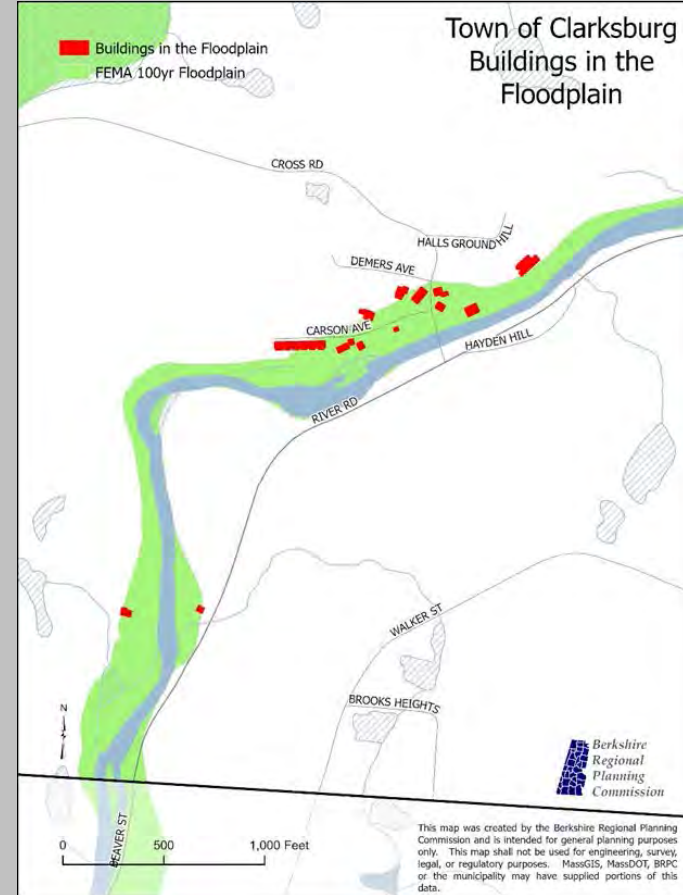
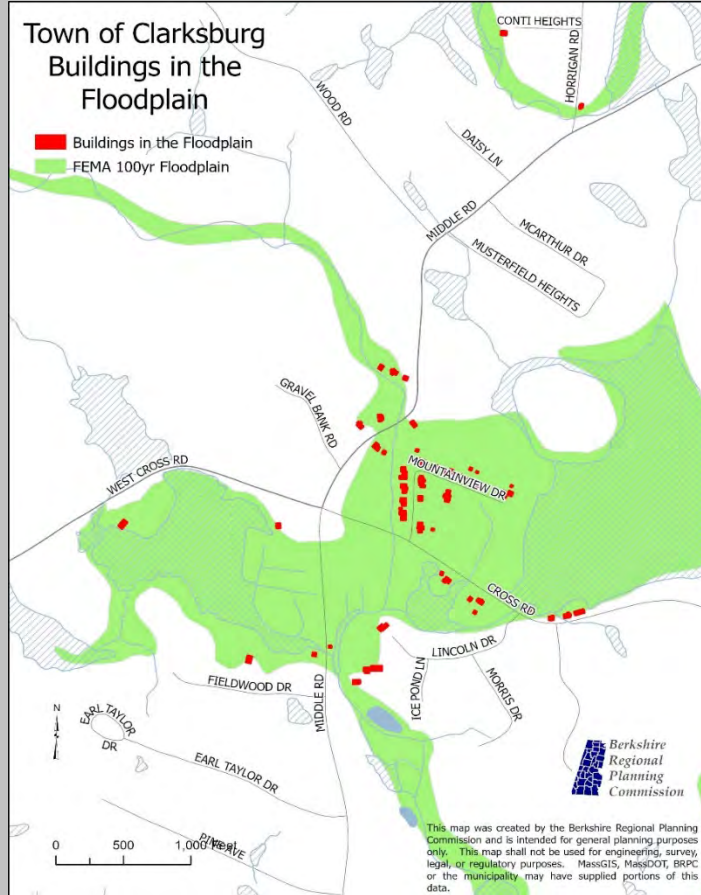
- River Road collapses
- Several road damages & closures
- Flooding of property & basements
- Fire Dept. receives >50 calls
- Some evacuations
- Floodwaters approach Town Hall
- Conduit for travel for Vermonters
- T.S. Lee Sept. 2011



Areas of Concern

Floodplain Vulnerabilities

- 58 homes in 100-year floodplain
- 4 businesses in floodplain
- Road flooding:
Cross/Carson
E. Cross/Lincoln



Mitigation Example: Benton Hill Rd., Becket

3 culvert bridge
replacements in 7
years

New full span bridge
reduces risk of
repeated failure



*Clockwise from top left:
First replacement crossing (2009); catastrophic culvert failure due to Tropical Storm Irene (2011); "emergency temporary replacement" crossing (2011); replacement bridge (2016).*

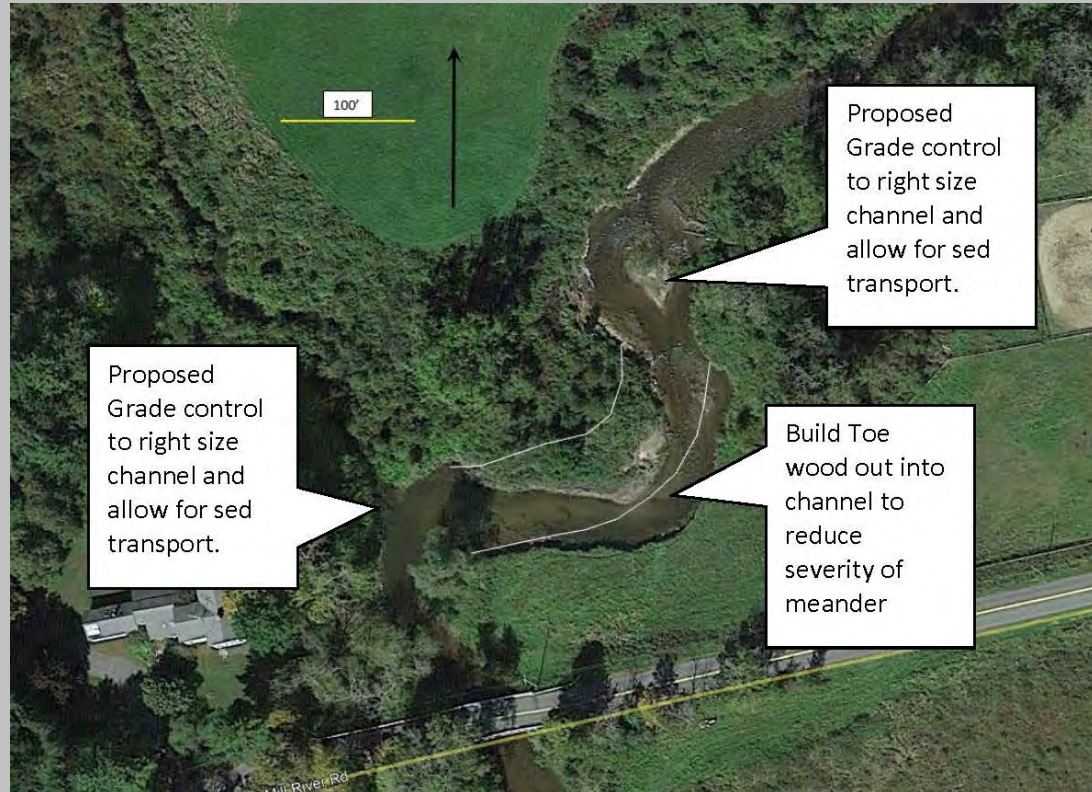
Areas of Concern

- Erosion of the bank on N. Branch Hoosic River
- Just above and below the Mary Baker bridge



Mitigation Example: Bank Stabilization, New Marlborough:

To reduce flooding
and possible loss
of road



Are You Ready for Electricity Outages?

Observed: household summer peak demand up 3-fold from 1960-2000

The energy sector's three major climate change concerns:

- Flooding (increased precipitation, flooding)
- Extreme events (hurricanes, snow, ice);
2008 some customers lost power for 2+ weeks
- Increased temperature (demand surge, damage to distribution system, controlled brownouts)

Are you prepared to open warming or cooling shelters?



Public Survey Results

- 51 surveys completed – **and it's still open!**
- Respondents from across Town
- Hazard cited most often is T.S. Irene: 61% mention it by name
- Washed out / closed roads and flooded property repeated often
- Need for more culvert & drain maintenance often mentioned



A word cloud visualization of survey results. The words are arranged in a non-uniform, overlapping manner. The most prominent words are 'Hurricane Irene' and 'property'. Other visible words include 'Clarksburg', 'storm', 'bridge', 'hurricanes', 'Rd', 'flooding', 'road', '2011', 'river', 'damaged', 'washed', 'Irene', and 'water'.

Clarksburg storm Irene bridge hurricanes property Rd
flooding road Hurricane Irene 2011 river
damaged washed Irene water

Public Survey Results

Rankings: natural hazards that concern residents the most

1. Flooding/washout of roads & Flooding of resident property
2. Flooding/washout of roads & Severe winter weather
3. Other severe storms & Vector-borne diseases

Rankings: why residents are concerned about hazards

1. Injury or loss of life & Not being informed of impending disaster
2. Loss of electricity & Being isolated (rd. washout, no communication)
3. Being isolated & Loss of property

Natural Hazards Themes

- **Flooding and Vulnerable Infrastructure**

- Several culverts were enlarged post-Irene; more need to be done
- Cross-town emergency routes vulnerable: River Rd., Cross Rd.
- N. Branch Hoosic River bank erosion

- **Emergency Preparedness**

- Need for town-wide emergency notification system
- Protect governmental operations



Major Recommended Actions

- Pursue road improvements with flooding in mind:
 - Replace Cross Rd. bridge - high priority (currently in design)
 - Replace upper Middle Rd. (currently in design)
 - Repair retaining wall Cross Rd.
 - Investigate causes of chronic flooding at Cross Rd./Carson Ave.



Major Recommended Actions



- Establish a town-wide emergency notification system

- Floodproof ground floor of Town Hall for continuity of government operations
- Monitor riverbank erosion in area of Mary Baker bridge



Protecting Building Utility Systems From Flood Damage

Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems

FEMA P-348, Edition 2 / February 2017



Now it's Your Turn!



**Help town officials,
first responders and
fellow residents
prioritize the most
important actions**

Seeking Public Comments

- **Fill out the public survey if you haven't done so through May 21:**
<https://www.surveymonkey.com/r/ClarksburgHM>
- **Provide comments about tonight's presentation**
- **Review / comment on the Draft Hazard Mitigation and Climate Adaptation Plan when it's posted June 11-30**
- **Send comments to: lauren@berkshireplanning.org**