# Town of Buckland

## Community Resilience Building Workshop
## March 2018

Facilitated by the
Franklin Regional Council of Governments

## Summary of Findings

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# Town of Buckland
# Community Resilience Building Workshop
# Summary of Findings

## Overview:

Throughout Franklin County, Massachusetts, communities are experiencing more extreme weather events – especially heavy rains and flooding – along with higher temperatures and other climate-related conditions. These types of conditions are predicted to increase as a result of climate change.

In the face of these changes, municipalities have more of a sense of urgency to increase their resilience and adapt to extreme weather events and mounting natural hazards. Relatively recent events such as Tropical Storm Irene and "Snow-tober", both in 2011, have reinforced this urgency and compelled communities like the Town of Buckland to proactively plan and mitigate potential risks. This type of planning will reduce the vulnerability of Buckland's people, infrastructure and natural resources, and will empower Buckland's officials and citizens alike to take steps to protect themselves and their community.

In the winter of 2018, with funding from the Massachusetts Executive Office of Energy and Environmental Affairs, the Franklin Regional Council of Governments (FRCOG) offered the Town of Buckland technical assistance in completing their Community Resilience Building Workshop to achieve a designation as a Municipal Vulnerability Preparedness Community or "MVP Community". As a State-certified MVP Provider, the FRCOG helped Buckland engage in a community-driven process that brought together climate change information and local knowledge to inform the workshop, whose central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengthen and vulnerabilities;
- Develop prioritized actions for the Community; and
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

This report summarizes the findings of the Town of Buckland's Community Resilience Building Workshop.

# Community Resilience Building Workshop

## Summary of Findings

The Town of Buckland has conducted a number of planning projects in previous years, including its 2013 Hazard Mitigation Plan, which enabled the Town to identify high priority hazards, areas, infrastructure, and populations vulnerable to a variety of hazards. The Hazard Mitigation Plan also identified action items to potentially address hazards. Other recent Buckland plans include: 2017 Shelburne Falls Slum and Blight Study, 2016 Housing Plan, and 2010 Open Space and Recreation Plan. In 2017, the FRCOG completed the Deerfield River Watershed-Based Plan. This plan examined ways to maintain both the health and resiliency of the watershed, in which Buckland is located.

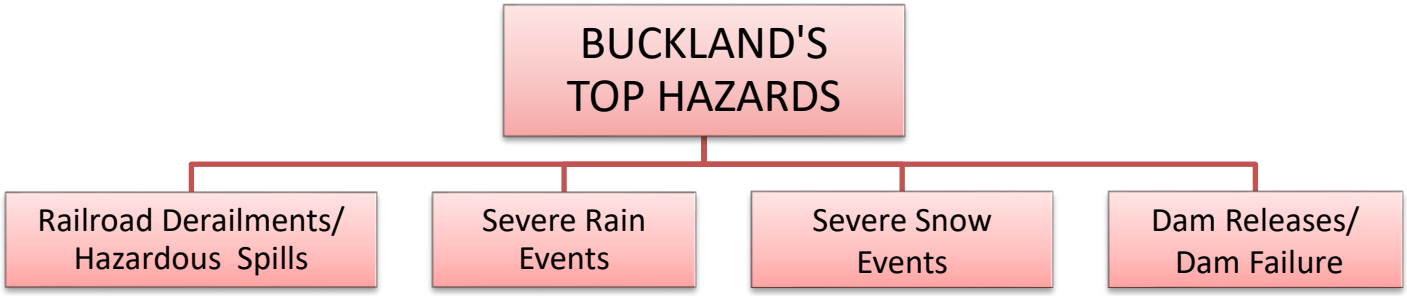
In spite of Buckland's diligence in completing these planning efforts, there was a need for the community to conduct an assessment across scales – from individual buildings and bridges to rivers and landscapes, and across sectors – infrastructure, society and environment – looking specifically through the lens of climate change and its likely impacts.

Workshop participants considered climate change impacts most likely to impact Buckland, include rising and extreme air temperatures, extreme weather events and increased precipitation, both in amount and intensity.

The workshop was critical to enabling participants to think about and engage with people from different sectors. The public water supply operator, first responders, a hydroelectric plant employee, highway department staff and others came together to determine the most threatening hazards to the Town of Buckland and to agree upon high priorities and actions to address them.

### *Top Hazards*

Workshop participants discussed a number of hazards that impact Buckland, deliberating on how frequent, how intense and how widespread each hazard has been and could potentially be in the future. Hazards discussed included: dam failures, severe winter storms/ice storms, earthquakes, hurricanes, wind storms/microbursts, tornados, ice jams, floods, wild fires, landslides, droughts, manmade hazards and extreme temperatures. Top hazards identified by the participants are as follows:



### *Areas of Concern*

*The following list contains general areas that are of concern to Buckland as well as specific concerns within each area.*

***Neighborhoods or areas of town:*** Downtown area of Buckland; elderly and/or isolated residents; people without phone coverage

***Roads, bridges and culverts:*** Culverts on South Street, Nilman Road, Elm Street and Charlemont Road; bridge on Apple Valley Road; gravel roads throughout town; roadside trees throughout town

***Rail system:*** New highway garage adjacent to rail line; Elm Street railroad crossing; rail nearby Buckland Recreation Area

***Public sanitation and water:*** Private wells; public water supply crosses Deerfield River on Bridge of Flowers and public sewer line crosses Deerfield River on the Iron Bridge

***Infrastructure and buildings:*** Town buildings (fire and police stations, town hall and old highway garage located in the downtown area of Buckland); town records; Mary Lyons Church; emergency communications infrastructure

***Ecosystems:*** Clesson Brook at Buckland Recreation Area; agricultural land along Deerfield River and Clesson Brook

*This December 2016 four-car derailment is just one of several rail-related incidents that have occurred in Buckland, leading to participants identifying railroad derailments/ hazardous spills as their number one hazard.*

### *Current Concerns & Challenges Presented by Hazards*

Participants in the workshop discussed a number of hazards, both natural and manmade which have impacted the community in recent years. The railroad, whose tracks run through Buckland, emerged as the top concern. Participants recalled recent derailments in town and a number of other issues related to the railroad, which are likely to continue in the future.

For many, Tropical Storm Irene in 2011 is a bellwether event, demonstrating the extent and severity of the types of extreme weather and increased rain that is predicted to become more

frequent in the coming years. Flooding in particular, fueled by heavy rains, was widespread after Irene. Flooding impacted the downtown area of Buckland, where floodwaters swept away a quilt shop and flooded businesses, and rural areas, where Clesson Brook jumped its banks and washed out roads including parts of Route 112. In the aftermath of Irene, some bridges were shut down, many roads were damaged with a few roads rendered impassable and many businesses shut down, some for several months in Buckland and surrounding communities.

Workshop participants expressed concern about heavy rain events and potential future flooding, particularly with the downtown area of Buckland located right next the Deerfield River. Buckland's Town Hall, Police and Fire are all in the downtown area of Buckland and in the 100-year floodplain, along with most businesses and vulnerable, low-income populations.

*Tropical Storm Irene, with widespread flooding, foreshadows the types of extreme weather events predicted to be more prevalent in the coming years, impacting waterbodies in Town, including the Deerfield River (left) and Clesson Brook (right).*

Heavy snow events were also identified as a top hazard, due to the potential for downed trees and power lines, widespread power outages and certain residents being cut off from the rest of the Town due to road closures. Even though most people in Buckland are used to heavy snow, such events can still have broad and significant impacts on the Town.

Finally, participants determined that water releases from upstream dams, including Harriman Dam, should be included as a top hazard, along with highly unlikely dam failures. Dam failure was included because of the potential widespread devastation and the relatively short amount of time - 2 ½ hours from the Harriman Dam - to evacuate before floodwaters reach the Town.

### *Specific Categories of Concerns and Challenges*

***Vulnerability of the Downtown Area of Buckland:*** *Several concerns about the downtown area of* Buckland were voiced by participants of the workshop. There is a concern about many of the Town's buildings (Fire and Police Stations, Town Hall and old Highway Garage) being located so close to the river and in the floodplain. The old Highway Garage still houses the salt and sand shed, which Town officials would like to move out of the floodplain. The Town has all current

records digitized but historic records kept at the Town Hall are vulnerable to floods, mold and deterioration.

***Sheltering of Buckland residents:*** Participants raised concerns about low-income residents who live in the downtown area of Buckland and who may have limited options for sheltering, should they have to evacuate their homes. There is no shelter in the downtown area of Buckland, which is in the floodplain. The regional shelter at the Mohawk Regional High School is about 2/10 of a mile from the potentially hazardous rail and the Deerfield River. Participants discussed the possibility of the Mary Lyons Church, which is not located near any known hazards, serving as a shelter however there are some modifications that would need to be made to the church facilities in order for this to happen, including purchasing and installing a generator and installing ADA accessible bathrooms.

*In the event of a railcar derailment, the Elm Street neighborhood currently has no evacuation route or plan.*

***Isolation of other residents:*** There are areas of Town where residents might become cut off in the event of flooding, road closures and other events. There is a bridge on Apple Valley Road which is in need of repair and which, if closed, would cut off access to some homes in the area.

Residents near the Elm Street railroad crossing could also be vulnerable should there be a derailment or other issue with a train which would necessitate residents' evacuation. There is currently no secondary evacuation route to direct residents away from the railroad in the event of a rail emergency and toward Bray Road. Access to Bray Road would have to be on foot over rough terrain.

There are some residents without land lines, with poor or no cell phone coverage and/or no broadband. Additionally, not all have signed up for Reverse 9-1-1, so reaching all residents in the event of a widespread emergency is very difficult.

***Vulnerability of roads, bridges and culverts:*** In addition to the vulnerable bridge on Apple Valley Road, major culverts on South Street, Nilman Road, Elm Street and Charlemont Road are in need of repair. The South Street culvert which, when flooded, can compromise access to the wastewater treatment facility, is slated to be repaired in the next few years. However, the other culverts are too expensive for the Town to repair and too large for the State's Culvert Replacement Municipal Assistance Grant Program.

Many smaller culverts in Buckland have also been identified as having "High" to "Medium" risk of failure through the MassDOT Stream Crossing Study for the Deerfield River Watershed.[1] These culverts pose a future risk to transportation and emergency response and should be prioritized for replacement with right-sized infrastructure to anticipate future rain events.

Many gravel roads in Town are vulnerable to wash-outs due to the steepness of the roads and other conditions and, although residents often voice concern about their gravel roads, most residents do not want them paved. Roads are also at risk of closure should trees be downed during a storm, since over 80% of Buckland is forested.

***Vulnerability of Town residents and facilities due to railroad:*** As was discussed earlier, rail lines are high on participants' list of concern. In addition to the issue of the Elm Street crossing and lack of evacuation options for residents on Elm Street, there are also several other railroad crossings that are of concern to participants.

Rail lines run less than 200 feet from the Deerfield River in the south part of Town and are less than 100 feet from homes and other structures in other parts of Town, including the new Highway Garage, which is to be built on Sears Street on the site that currently houses the existing Highway Garage and used to be the Mayhew Steel Factory. Given the history of train derailments in Town, there are concerns about the proximity of homes and structures to the rain lines.

***Uncertainty of water supplies during hazards or power outages:*** Nearly 40% of residents rely upon private wells for their drinking water. In the event of a prolonged power outage, these residents would be without water, unless an emergency water supply or system was established. The remaining 60% of residents rely upon public water which is delivered to residents via a water line that runs along the Bridge of Flowers over the Deerfield River. There is a valve to turn off water in the event of an emergency after which residents would have xx days of drinking water available before stored water would be depleted. There is a concern on the part of participants that debris collecting on the upstream side of the Bridge of Flowers during and after high flows might threaten the drinking water line.

***Vulnerability of land near waterbodies:*** Situated near Clesson Brook, the Buckland Recreation Area and the river banks along Clesson Brook have been subject to erosion since Tropical Storm Irene in 2011. This erosion now threatens the access road and parking lot at the Rec Area.

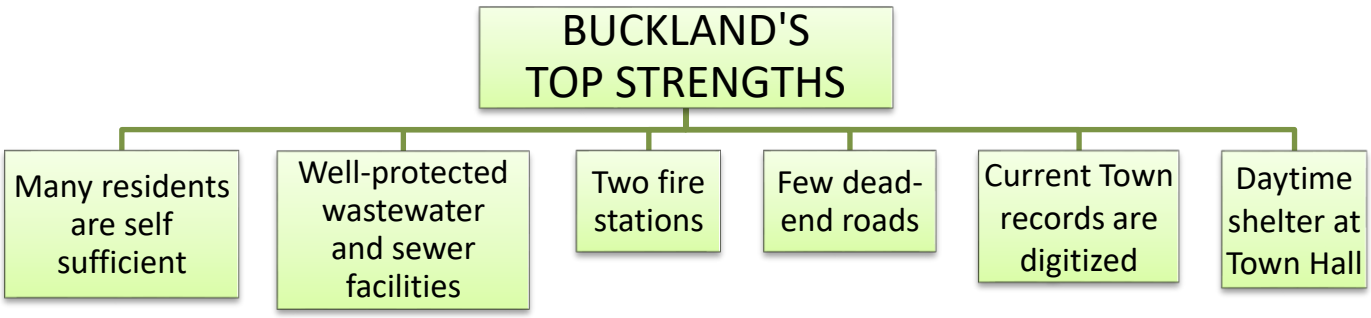
Also situated along Clesson Brook are working farms which lost valuable farmland soils to washouts and erosion during Irene. These areas continue to be at risk for erosion. Farmers were not able to find funding to help them recover from their farmland losses after Irene.

[1] MassDOT Stream Crossing Explorer: http://sce.ecosheds.org/#

*Clesson Brook overflowed its banks and adjacent roads and farm fields, wiping out crops and washing away agricultural soils.*

### *Current Strengths and Assets*

Buckland residents, for the most part, know how to take care of themselves during routine snow storms, power outages and other such conditions. Participants expressed pride that people who have lived in Buckland for a long time are accustomed to weathering storms and helping out neighbors. Many families in Town know each other and know the first responders and Town staff who help run the Town. Participants sited several strengths and assets that help keep their community resilience in the face of climate change and other challenges. They include:

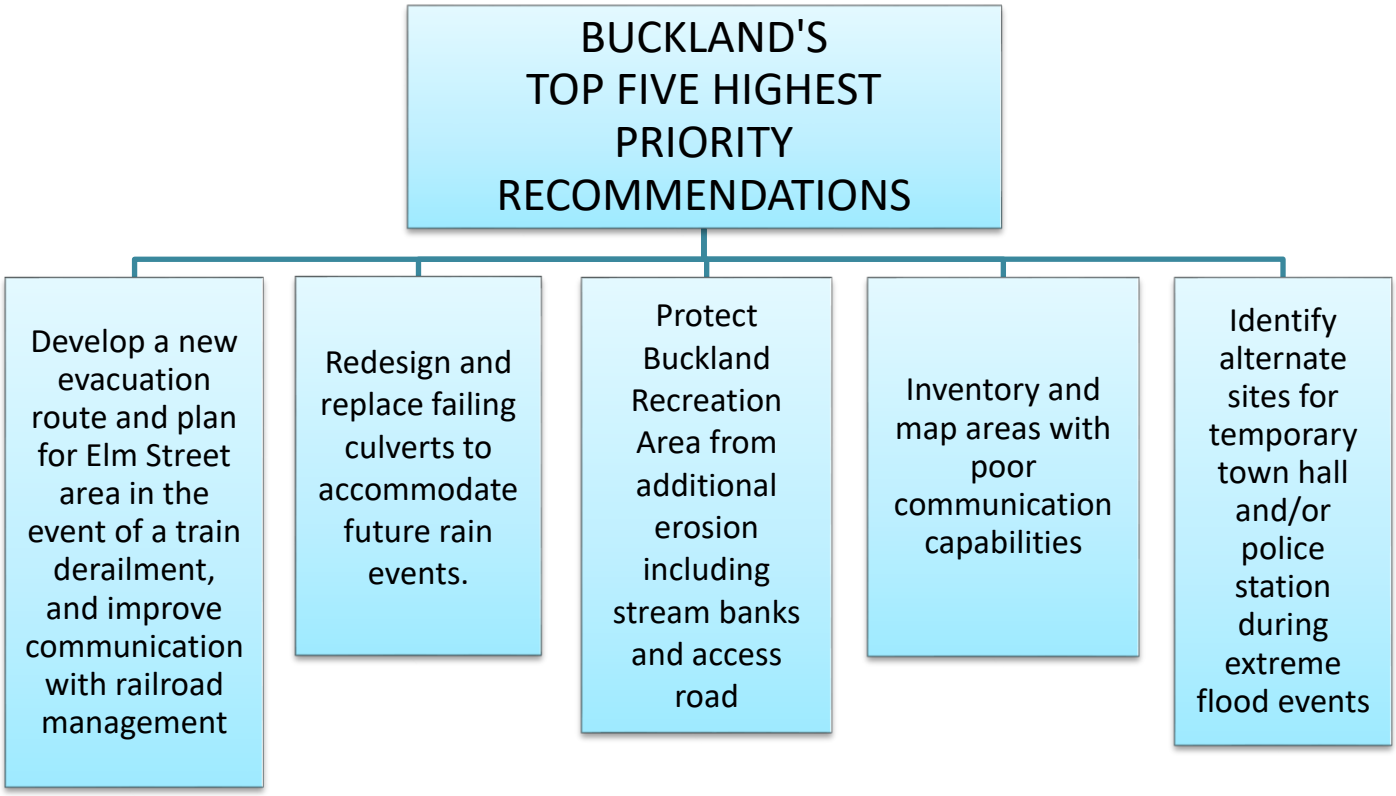



- ***Self-sufficiency:*** The "locals" or "old-timers" know how to deal with whatever nature brings their way.

- ***Wastewater and sewer:*** The wastewater treatment facility is well protected by the topography of the land. The wastewater treatment facility and the pumping station have their own stand-by power. The sewer line, located on the downstream side of the Iron Bridge, is protected as well.
- ***Fire and Police:*** A second fire station is located in Upper Buckland, well away from threat of flooding. Although fire and police facilities are located in the floodplain, department officials said they are able to move equipment and vehicles out of the floodplain if floodwaters are threatening the facilities.
- ***Road network:*** There are few dead end roads in Town, so there are alternatives in the event of road closures or washouts.
- ***Town records:*** Current Town Hall records are digitized and stored off-site (cloud storage).
- ***Sheltering:*** The Town Hall serves as an accessible, daytime heating and cooling center, with a generator and kitchen.

### *Top Recommendations to Improve Resilience*

The railroad was a common topic of conversation during the workshop. Just as the railroad was rated as a top hazard by participants, two of the five highest priority recommendations for the Town of Buckland involve the railroad.




Addressing concerns about a railroad derailment or other disasters led the participants to determine that developing a new evacuation route and plan for residents in the Elm Street area is one of the five highest priorities for the Town. Participants were undeterred by the fact that

implementation of this recommendation might require an easement or other strategy to gain access to nearby streets for evacuation. Initial implementation steps would include conducting a detailed vulnerability assessment to determine the number of vulnerable residents, and mapping alternatives for a safe and effective evacuation route. This recommendation would also include educating the public about the new evacuation route and plan.

Participants acknowledge significant challenges working with the private railroad entity, but are determined to improve communication with the railroad. To implement this recommendation, the Town could conduct a systematic risk assessment along the railroad corridor in Town, identifying hazards such as discarded railroad ties which could catch fire. Findings of the assessment could be prioritized and provided to the railroad as a check-list for the town to track progress with the railroad.

Another high priority for the Town is the replacement and redesign of many of the failing and "at risk" culverts throughout Buckland. The failure of these culverts threatens to cut off communities and important infrastructure during emergencies. There are three major culverts on Nilman Road, Elm Street and Charlemont Road that are in need of repair or replacement and are, unfortunately, too large to be eligible under the State's Culvert Replacement Municipal Assistance Grant Program, but are too expensive for the Town to fund itself. In addition to these three specific culverts, there are many smaller ones that have also been identified as having "High" to "Medium" risk of failure through the MassDOT Stream Crossing Study for the Deerfield River Watershed.[2] These culverts pose a future risk to transportation and emergency response and should be prioritized for replacement with right-sized infrastructure to anticipate future rain events. This priority was echoed in the 2017 Deerfield River Watershed-Based Plan as one of the top four action items for the Clesson Brook subwatershed.

The Buckland Recreation Area was a topic of discussion during the workshop and participants discussed significant issues of erosion. Streambank stabilization is needed along Clesson Brook, which flows along the Rec Area, and reconstruction and/or relocation of the access road into the Rec Area is necessary. Implementation of this recommendation includes the use of green infrastructure, such as stream buffers, bio-retention systems and other such techniques to protect both the Rec Area and the quality of water in Clesson Brook. Ecological restoration of the streambank and corridor is also necessary. A feasibility assessment and conceptual designs are two of the first steps in implementing this recommendation. The Deerfield River Watershed-Based Plan recommends conducting fluvial geomorphic assessments for the Clesson Brook to "refine the location, severity, and likelihood of erosion hazards and the potential impacts restoration/mitigation projects might have on channel stability.

Another highest priority recommendation is to determine exactly where there are pockets of poor communication services, such as poor or no cell phone coverage and/or lack of broadband. This will help first responders and others understand where extra efforts may be

[2] http://sce.ecosheds.org/#

needed to contact people in the event of an emergency. Implementation of this project would require a detailed vulnerability and risk assessment, using GIS mapping and other available techniques to identify areas and vulnerable populations lacking communication services. Findings from the assessment could help determine placement of new cell towers and/or other communication infrastructure.

A recommendation to determine alternates sites for town hall and police operations during extreme flood events was also a top priority. Part of this recommendation should include planning and assessment for the possible redesign and/or retrofitting the two facilities, as well as evaluating the feasibility of relocating facilities outside of the flood hazard area.

A number of other recommendations emerged during the workshop. Some recommendations are far-reaching and/or expensive and others are modest or relatively affordable. Following is the Community Resilience Building Risk Matrix, sorted by priority, which illustrates how many of the recommendations are relevant to more than one top priority hazard. In fact, ten of the 25 recommendations are relevant to all four of the top priority hazards. Because many of the recommendations are similar to ones in the Deerfield River Watershed-Based Plan, the actions in this matrix will also strengthen the Deerfield River's watershed health, in addition to reducing the vulnerability of the communities that live within the watershed. Following the matrix is a complete bulleted list of recommendations, sorted by highest priority, moderate priority and lower priority.

## Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

**H-M-L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
**V** = Vulnerability **S** = Strength

| Features | Location | Ownership | V or S | Recommendations | Top Priority Hazards: Railroad Derailments/ Hazardous Materials | Severe Rain Events | Severe Snow Events | Dam Releases/ Failure | Priority (H - M - L) | Time (Short Long Ongoing) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infrastructural** | | | | | | | | | | |
| Wastewater Facility & Pumping Station | Village | Shelburne Water District | S | Is not likely to flood, nor is pumping station. Access to facility is threatened by South Street culvert , which is scheduled to be replaced in 2021. | | x | | x | H | S |
| Large Culverts | Town-wide | Town | V | Secure funding to replace three large culverts. | | x | | x | H | L |
| Drinking Water Infrastructure | Village | Shelburne Fire District | V | Secure the public water line on Bridge of Flowers to better protect from floods, debris piles, and log jams. | | x | | x | H | L |
| Railroad | Town-wide | Private | V | Improve communication with the railroad company. Create an emergency procedure for residents near rail line and identify evacuation routes for residents who may be isolated in an emergency. | x | | | | H | S |
| Emergency Communications (Radio System) | Town-wide | Town | V | Secure funding to fix radio system used by emergency personnel. | x | x | x | x | H | S |
| Mohawk Regional High School/Middle School | High School | Regional | V/S | Conduct an evacuation drill. | x | x | x | x | H | S |
| Communication System | Town-wide | Private | V | Identify areas in Town where there are gaps in communications systems if landlines do not work (i.e.. where are there holes in broadband and cell coverage) | x | x | x | x | H | S |
| Town buildings are in the downtown floodplain (Town Hall, Fire Station, Police Station, Old Highway Garage) | Village | Town | V | Identify an alternate town hall and police station in case of emergency in the downtown area of Buckland. | x | x | x | x | H | S |
| Tree Maintenance | Town-wide | Town/Private | V | Make Tree Warden responsible for identifying vulnerable trees and notify Eversource | | | x | | M | S |
| Old Highway Garage | Village | Town | V | Secure funding to build a sand/salt shed at the new Highway Garage site along with diesel tank storage. | | | x | x | L | L |
| | | | | | | | | | | |

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## Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

**H**-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
**V** = Vulnerability **S** = Strength

| Features | Location | Ownership | V or S | Recommendations | Top Priority Hazards: Railroad Derailments/ Hazardous Materials | Severe Rain Events | Severe Snow Events | Dam Releases/ Failure | Priority (H - M - L) | Time (Short Long Ongoing) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Societal** | | | | | | | | | | |
| Council on Aging | Shelburne | Regional | S | Support the COA vans and Meals-on-Wheels | x | x | x | x | H | O |
| Reverse 911 for Elders and School | Town-wide | Town | S | Continue to reach out to elders to ensure that they are signed up for Reverse 911 program | x | x | x | x | H | O |
| Low Income Concentration in Village | Village | Private | V | Low income households may not have ability to seek shelter in emergencies. Work with Mary Lyon Church to purchase and install a generator and create an ADA accessible bathroom | x | x | x | x | H | S |
| Residents along Railroad | Town-wide | Private | V | Educate residents on what to do in a railroad-related emergency. | x | | | | H | S |
| Autistic Housing | Creamery Road | Private | V/S | Establish better communications with facility. | x | x | x | x | M | S |
| Informal neighborhood connections | Town-wide | Private | S | Determine if neighborhood contacts should be established to help disseminate information. | x | x | x | x | L | S |
| Summer Camp | Buckland Recreation Area | Town | V | Evaluate current evacuation procedures along Rt. 112 with no sidewalk. | x | x | | x | L | L |
| Dzog Chen Tibetan Retreat | Southern Buckland | Private | V/S | Coordinate emergency access to site with owners. | x | x | x | x | L | L |
| Cultural District | Village | Town/Private | V/S | Determine ways to protect the cultural and historic resources of the Village in case of flooding. | | x | | x | L | O |
| **Environmental** | | | | | | | | | | |
| Drinking Water Supply | Colrain | Shelburne Falls Fire District | V/S | Review and update the 2003 Source Water Assessment Project report for the Shelburne Falls Fire District wells located in Colrain. | x | x | | | H | O |
| Clesson Brook @ Buckland Recreational Area | Buckland Rec. | Town | V | Access road to Rec Center is threatened by erosion from Clesson Brook. Road needs to be moved and bank stabilization needed. | | x | | | H | S-L |
| Deerfield River | Town-wide | Town/State/Private | V/S | Partner with Trout Unlimited on water quality issues such as RR debris | x | | | | M | S |
| Farmland | Town-wide | Private | V/S | Investigate resources, funding, info for landowners | | x | | | M | S |
| Recreational Amenities | Town-wide | Town/State/Private | S | When construction projects are occurring, recreational/environmental aspects should be incorporated | | x | | | L | O |
| Access to River | Town-wide | Town/State/Private | S | Increase access to river for recreational purposes | | x | | | L | O |

### *Other Highest Priority Recommendations*

- Replace South Street culvert which, when flooded, inhibits access to the wastewater treatment facility
- Secure funding to replace other three large culverts: Elm Street, Nilman Street, and Charlemont Road
- Secure the public water line on Bridge of Flowers to better protect from floods, debris piles, and log jams.
- Secure funding to fix the FRCOG-owned radio system used by emergency personnel.
- Conduct an evacuation drill of Mohawk Regional High School.
- Continue to fund and support the Council on Aging vans and Meals-on-Wheels
- Continue to reach out to elders to ensure that they are signed up for Reverse 911 program.
- Educate residents on what to do in a railroad-related emergency.
- Work with Mary Lyon Church to purchase and install a generator and create an ADA accessible bathroom so that the Church can serve as a shelter facility.
- Review and update the 2003 Source Water Assessment Project report for the Shelburne Falls Fire District wells located in Colrain.

### *Moderate Priority Recommendations*

- Make Tree Warden responsible for identifying vulnerable trees and notifying Eversource of needed maintenance.
- Establish better communications with the facility that houses autistic individuals.
- Partner with Trout Unlimited on water quality issues caused by leaching from discarded railroad ties.
- Investigate resources and sources of funding for farmers who loose farmland to flooding and/or erosion and who need bank stabilization and river buffers.

### *Lower Priority Recommendations*

- Secure funding to build a sand/salt shed at the new Highway Garage site along with diesel tank storage.
- Determine if neighborhood contacts should be established to help disseminate information.
- Evaluate current evacuation procedures along Rt. 112 where there is no sidewalk.
- Coordinate emergency access to Dzog Chen Tibetan Retreat with the facility's owners.
- Determine ways to protect the cultural and historic resources of the Village in case of flooding.
- Incorporate green infrastructure into constructions projects including those at the Buckland Recreation Area.

### *CRB Workshop Participants: Department/Commission/Representative:*

| Name | Affiliation | Position |
|---|---|---|
| Matthew Cole* | Great River Hydro Company | Community Relations |
| Steven Daby* | Buckland Highway Department | Superintendent |
| Dan Fleuriel* | Shelburne Falls Wastewater Treatment | Superintendent |
| Rick Bardwell* | Shelburne Falls Fire Department | Fire Chief |
| John Ferris* | Shelburne Falls Fire Department/ Water District | Assistant Superintendent |
| Dena Willmore* | Buckland Select Board | Select Board member |
| James T Hicks* | Buckland Police | Police Chief |
| Andrea Llamas* | Buckland | Town Administrator |
| Herb Guyette* | Upper Buckland Fire Department/EMD | Emergency Management Director |
| Kimberly Noake MacPhee* | Franklin Regional Council of Governments | Land Use and Natural Resources Program Manager |
| Megan Rhodes* | Franklin Regional Council of Governments | Senior Transportation and Land Use Planner |
| Mary Chicoine* | Franklin Regional Council of Governments | Senior Land Use and Natural Resources Planner |

*Attendee

### *CRB Workshop Project Team: Organization and Role*

#### *Franklin Regional Council of Governments:*

Megan Rhodes, Project Lead and Principal Contact
Kimberly Noake MacPhee, Lead Co-Facilitator
Mary Chicoine, Facilitator

#### *Town of Buckland*

Andrea Llamas, Principal Contact

### *Recommended Citation*

Rhodes M. Noake MacPhee K. and Chicoine M. (2018) Town of Buckland Community Resilience Building Workshop Summary of Findings. Franklin Regional Council of Governments.

### *Photo credits:*

| | | |
|---|---|---|
| Cover | Tropical Storm Irene floodwaters | Recorder |
| Cover | Tropical Storm Irene aftermath | Recorder |
| Cover | Downed utilities | WMECO |
| Cover | Railroad ties | David Grist |
| Cover | Railroad tracks | David Grist |
| Page 5 | Train derailment | Recorder |
| Page 6 | Deerfield River after Irene | MassLive |
| Page 6 | Clesson Brook after Irene | Recorder |

*All other photos not cited above were taken by the FRCOG*

# Appendices

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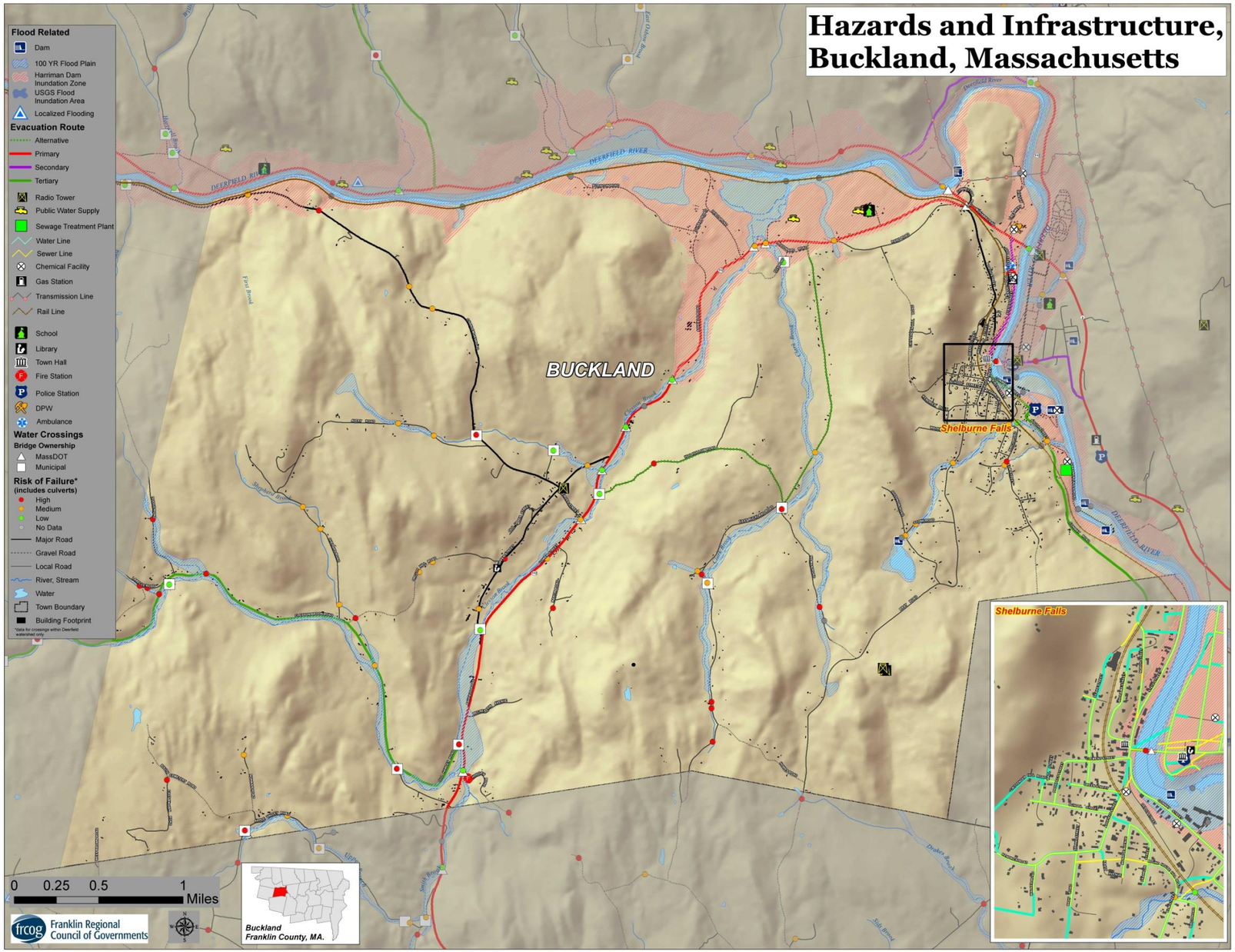
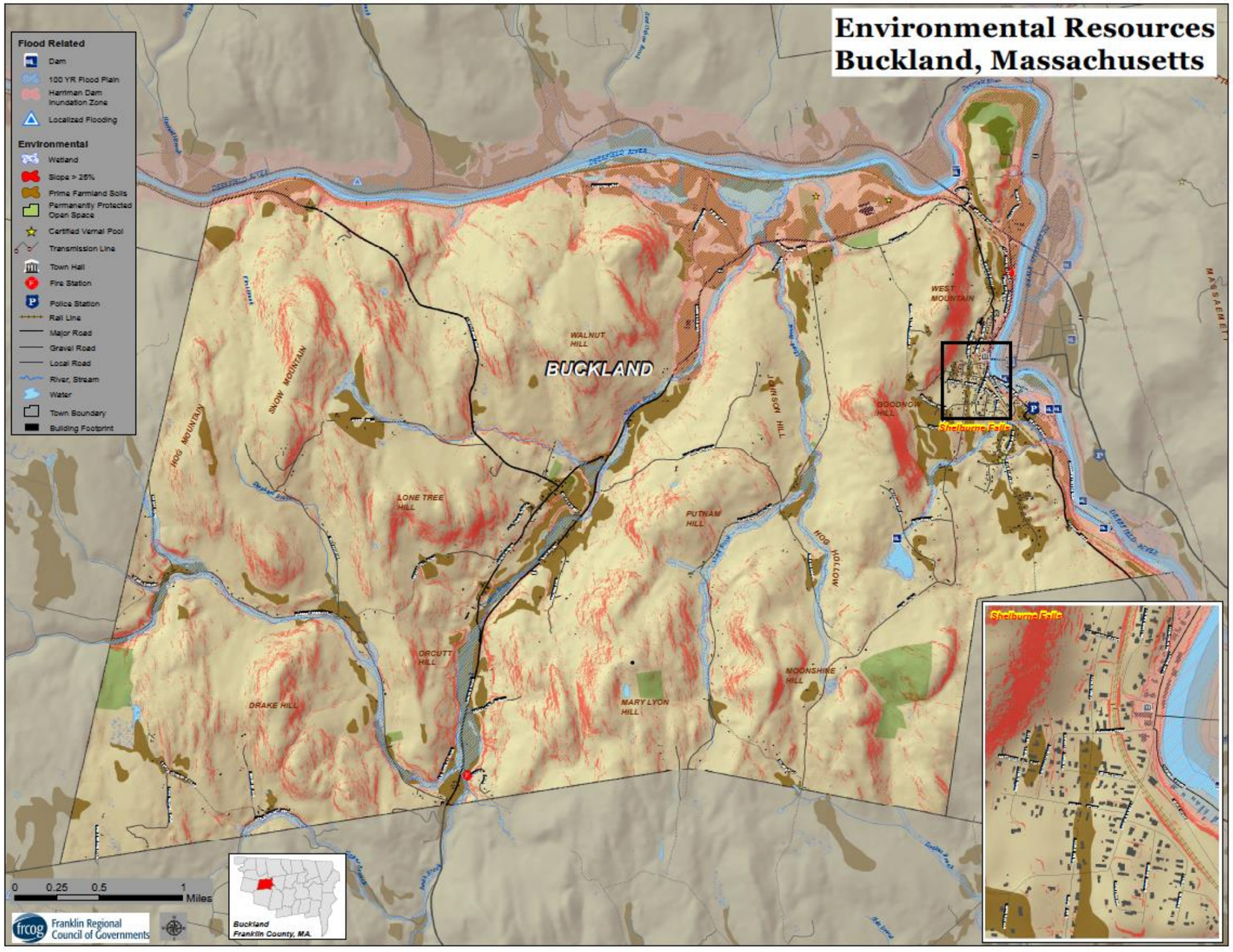
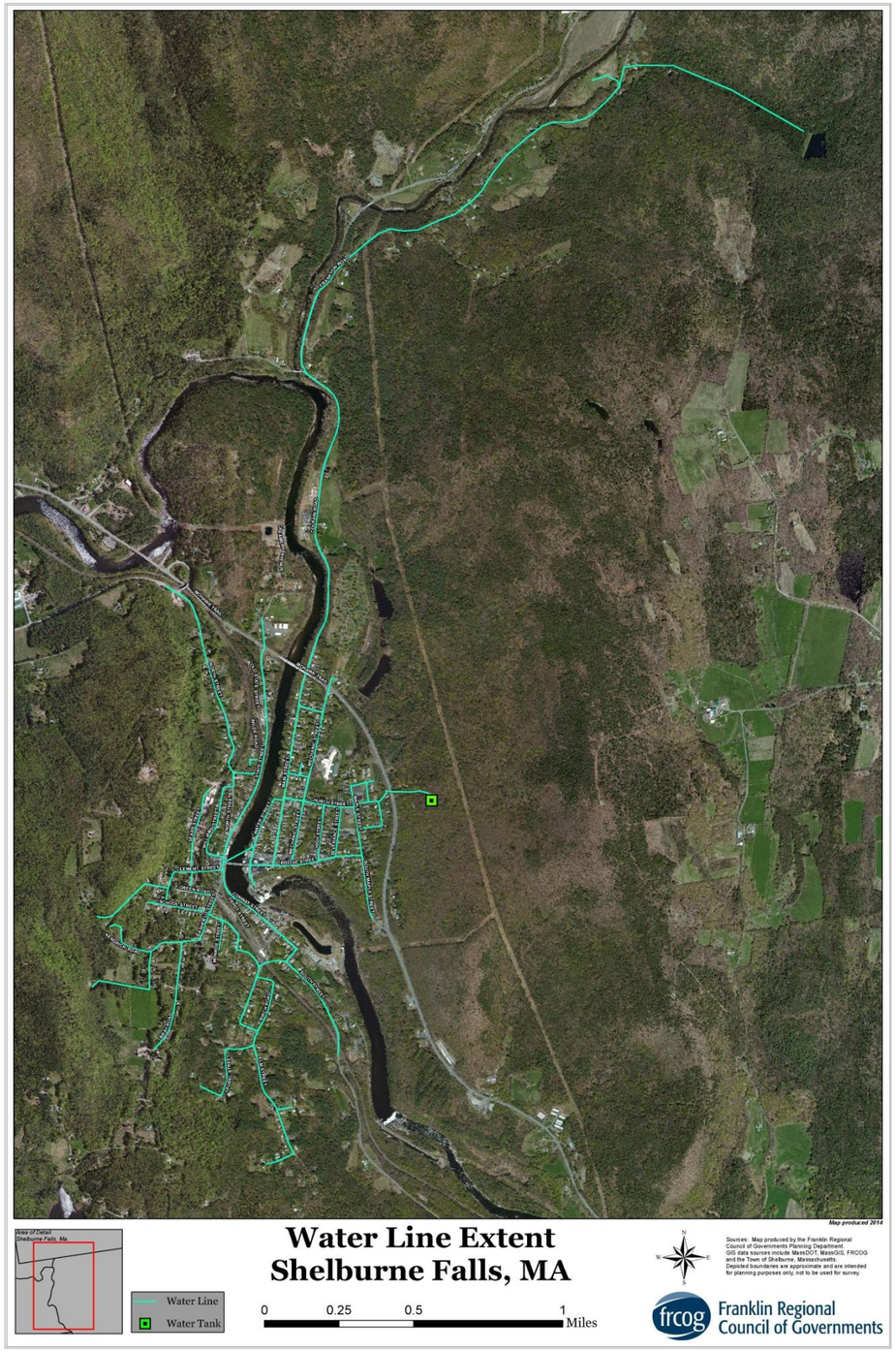
## BASE MAPS


Hazards and Infrastructure,
Buckland, Massachusetts
Flood Related
Dam
100 YR Flood Plain
Harriman Dam Inundation Zone
USGS Flood Inundation Area
Localized Flooding
Evacuation Route
Alternative
Primary
Secondary
Tertiary
Radio Tower
Public Water Supply
Sewage Treatment Plant
Water Line
Sewer Line
Chemical Facility
Gas Station
Transmission Line
Rail Line
School
Library
Town Hall
Fire Station
Police Station
DPW
Ambulance
Water Crossings
Bridge Ownership
MassDOT
Municipal
Risk of Failure*
(includes culverts)
High
Medium
Low
No Data
Major Road
Gravel Road
Local Road
River, Stream
Water
Town Boundary
Building Footprint
*data for crossings within Deerfield watershed only
BUCKLAND
DEERFIELD RIVER
Shelburne Falls
0 0.25 0.5 1 Miles
Franklin Regional Council of Governments
Buckland
Franklin County, MA.

**BASE MAPS**

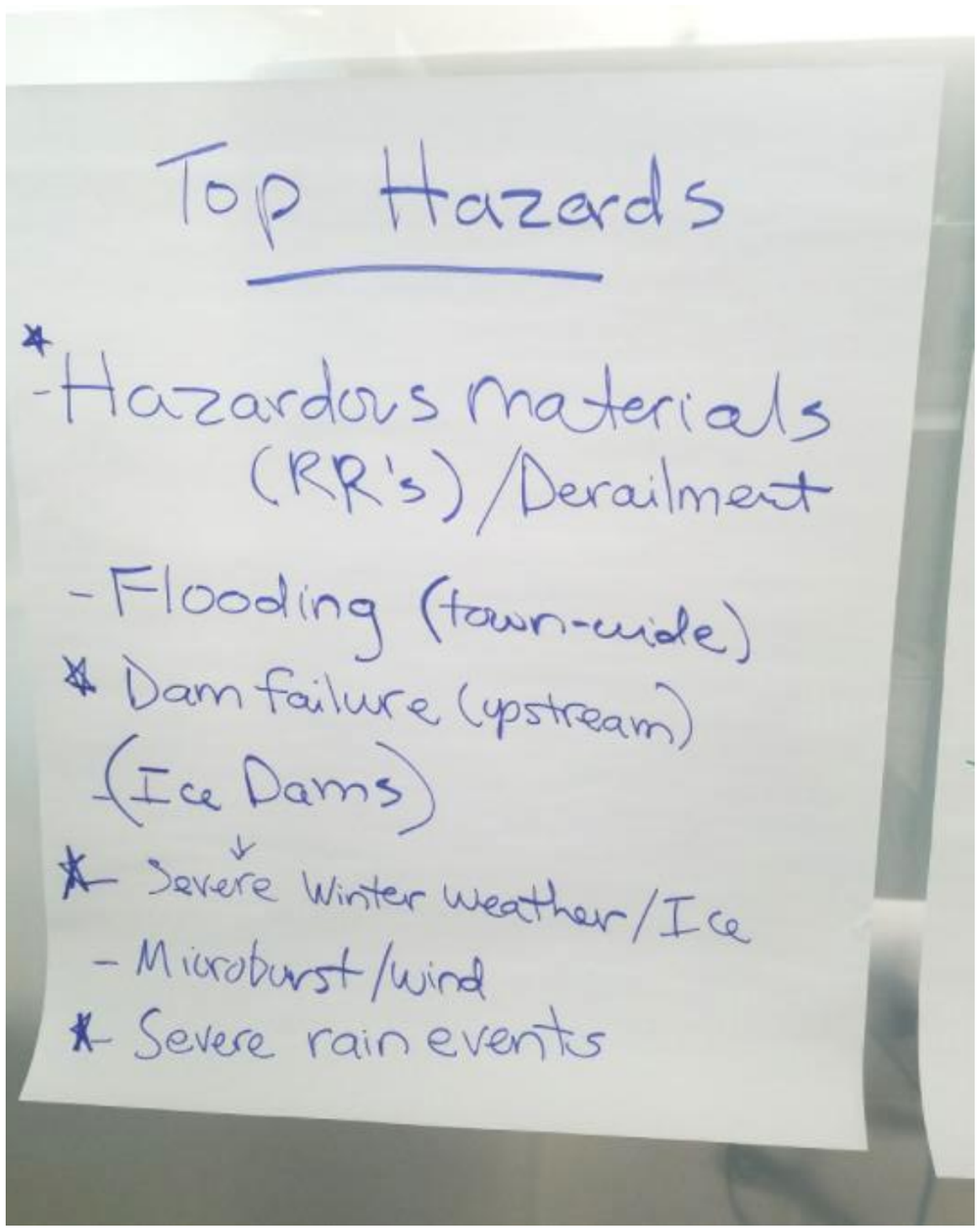

Environmental Resources
Buckland, Massachusetts
Flood Related
Dam
100 YR Flood Plain
Harriman Dam Inundation Zone
Localized Flooding
Environmental
Wetland
Slope > 25%
Prime Farmland Soils
Permanently Protected Open Space
Certified Vernal Pool
Transmission Line
Town Hall
Fire Station
Police Station
Rail Line
Major Road
Gravel Road
Local Road
River, Stream
Water
Town Boundary
Building Footprint
BUCKLAND
WALNUT HILL
SNOW MOUNTAIN
HOG MOUNTAIN
LONE TREE HILL
ORCUTT HILL
DRAKE HILL
PUTNAM HILL
MARY LYON HILL
HOG HOLLOW
MOONSHINE HILL
JOHNSON HILL
GOODNOW HILL
WEST MOUNTAIN
Shelburne Falls
0 0.25 0.5 1 Miles
Franklin Regional Council of Governments
Buckland
Franklin County, MA

## OTHER MAPS

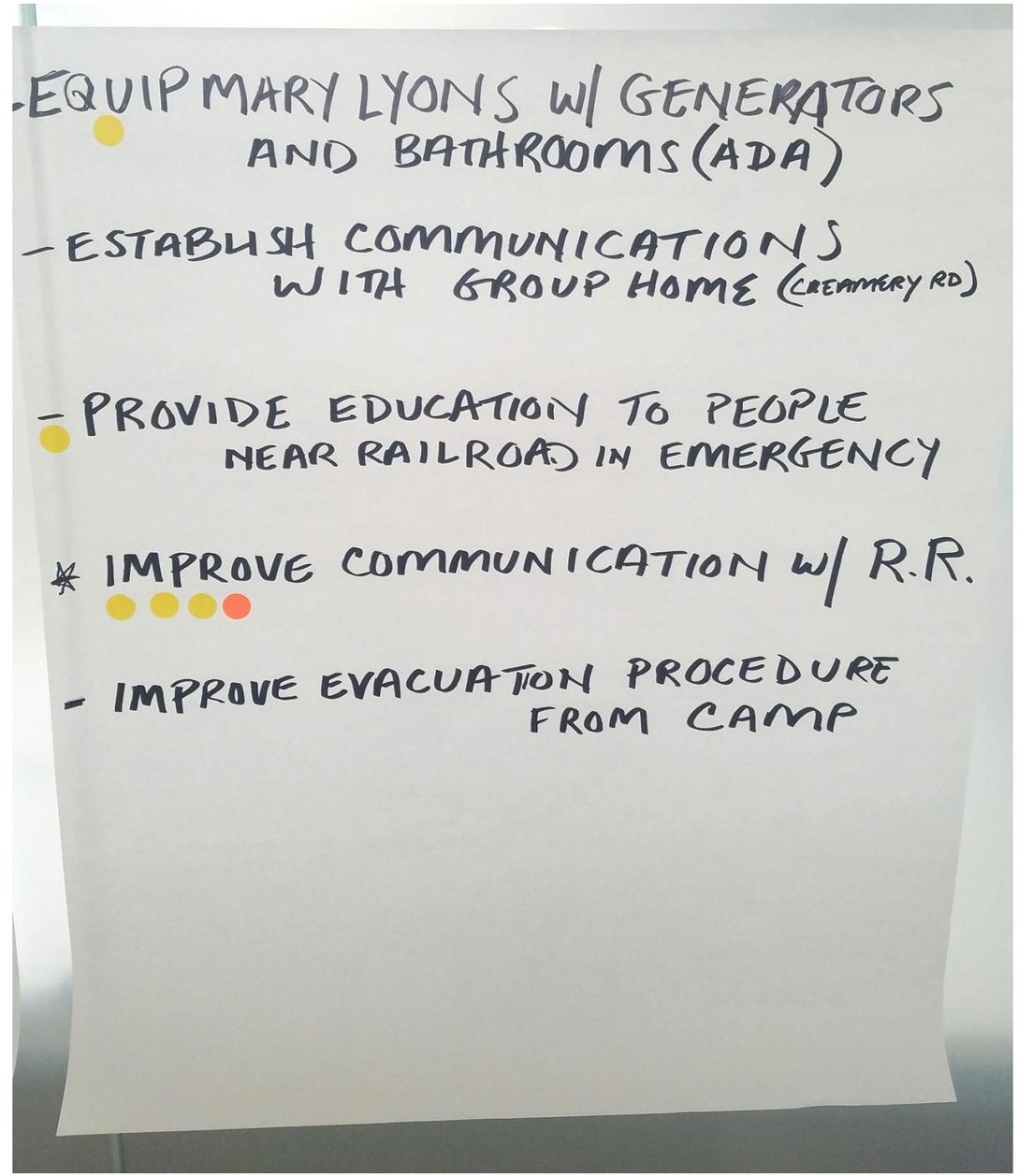

Water Line Extent
Shelburne Falls, MA
Water Line
Water Tank
0 0.25 0.5 1 Miles
Franklin Regional Council of Governments

Sewer Line Extent
Shelburne Falls, MA
Waste Water Treatment Facility
Sewer Line
0 375 750 1,500 Feet
Franklin Regional Council of Governments

### *Top Hazards*

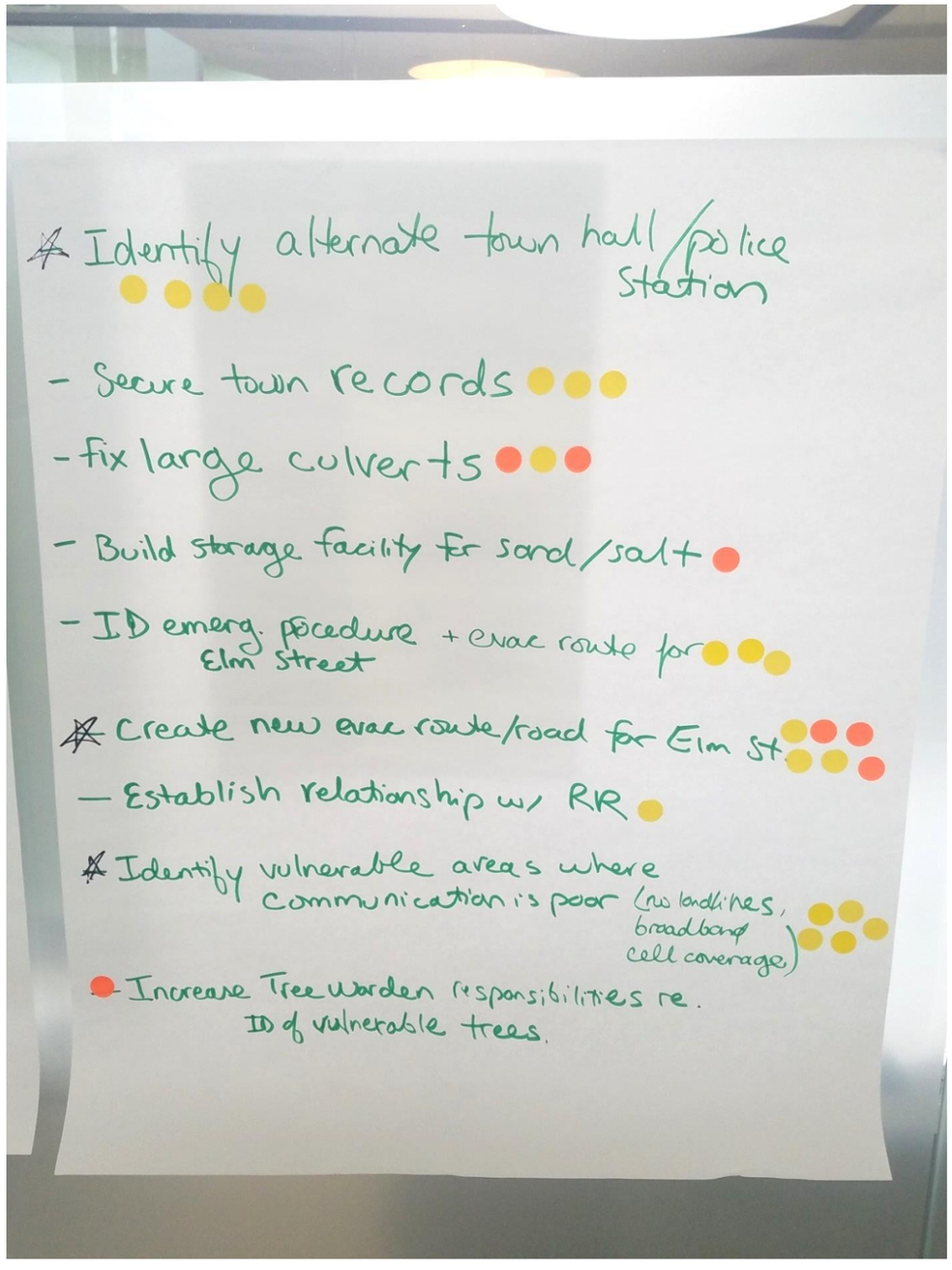



### *Recommendation Prioritization (1 of 3)*

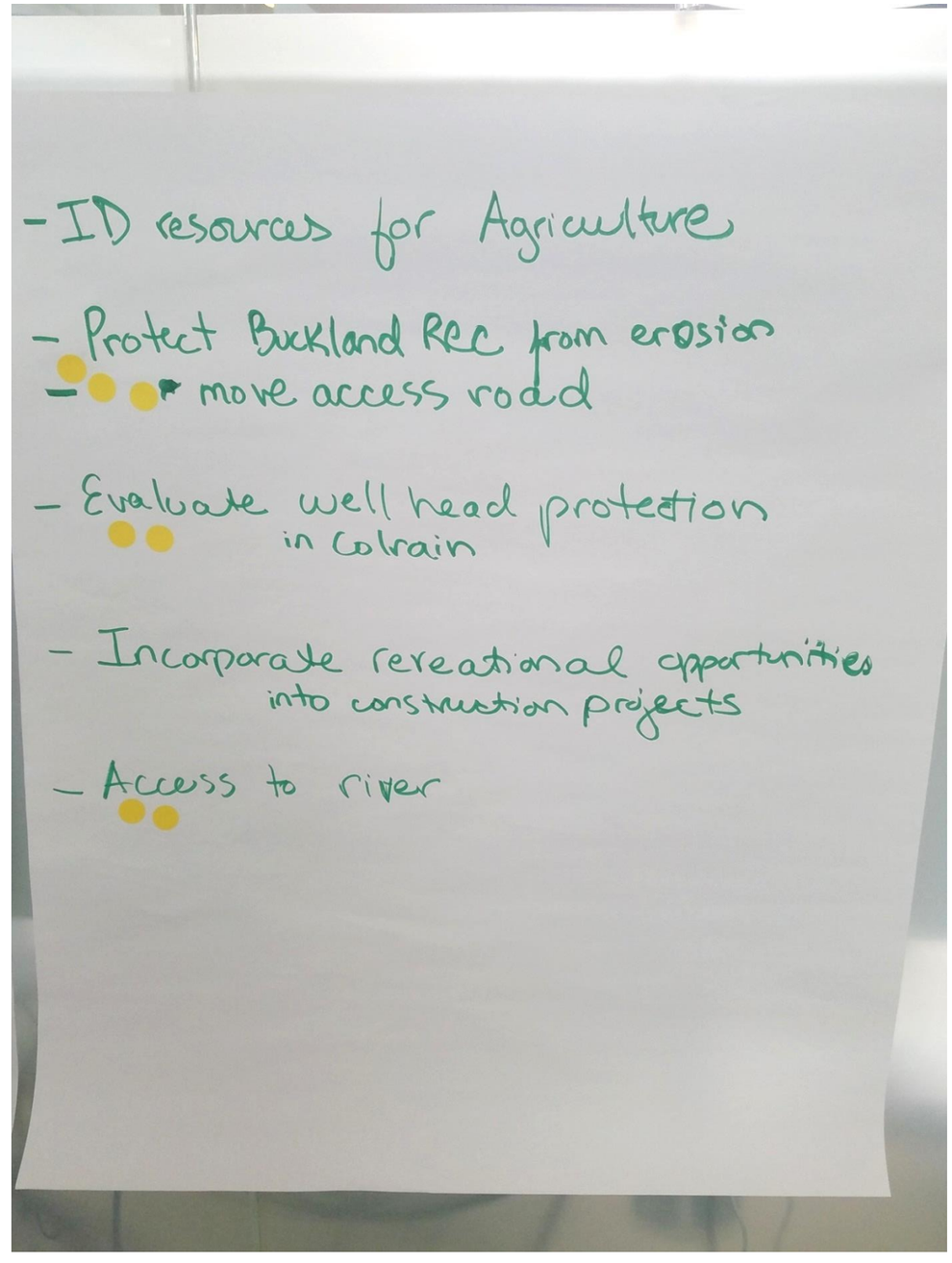


**EXERCISE OUTPUTS (CONT.)**

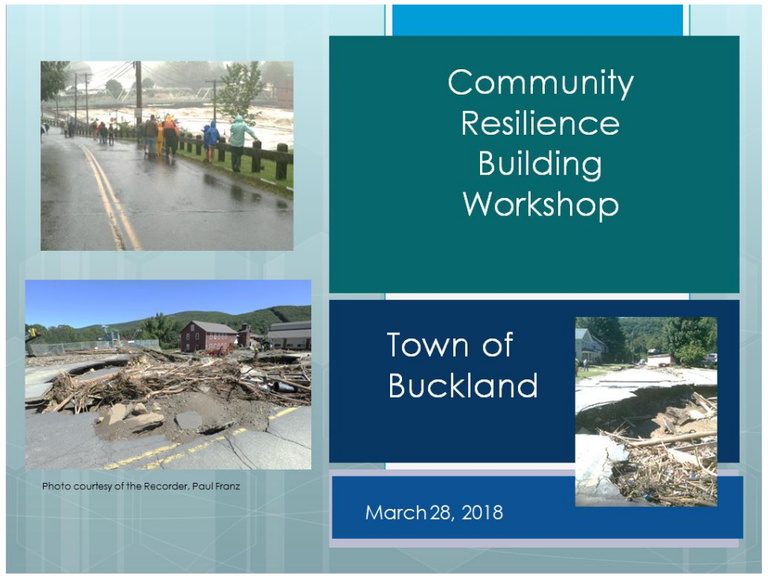
### *Recommendation Prioritization (2 of 3)*

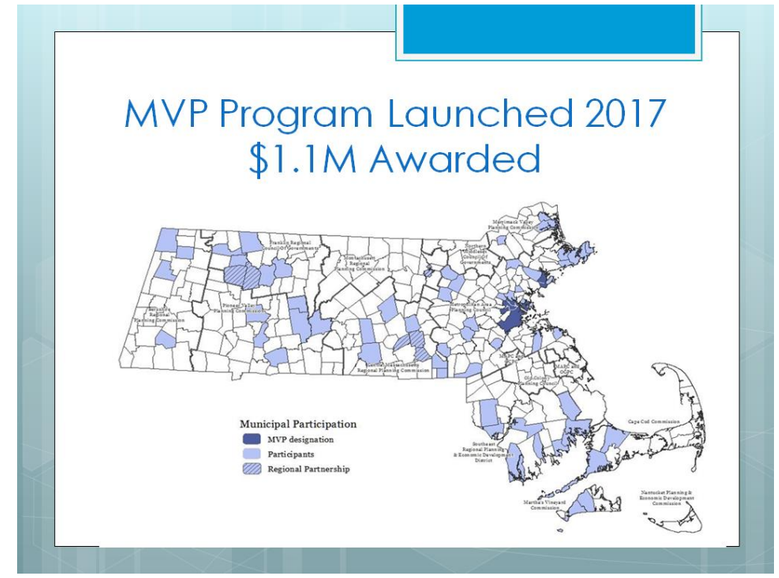


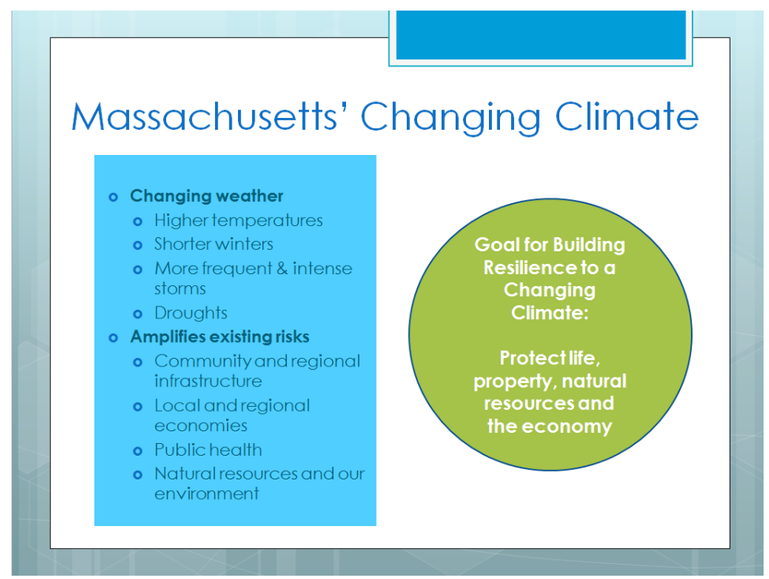

### *Recommendation Prioritization (3 of 3)*

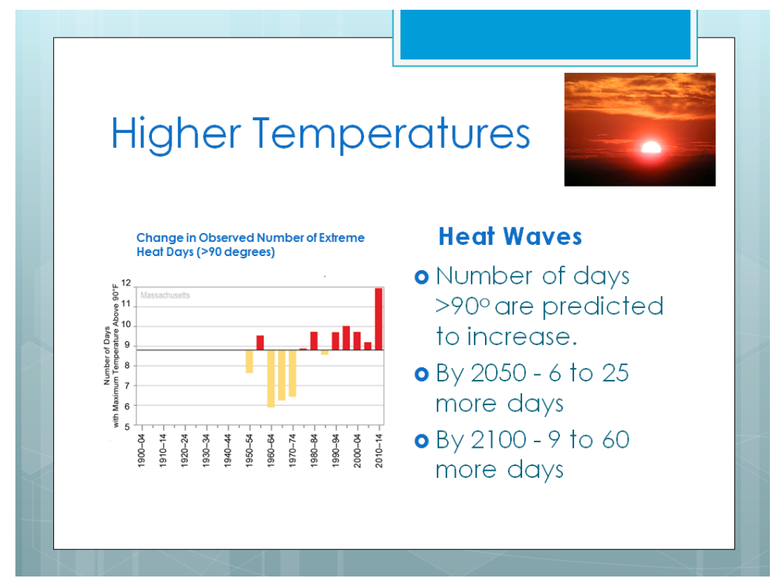


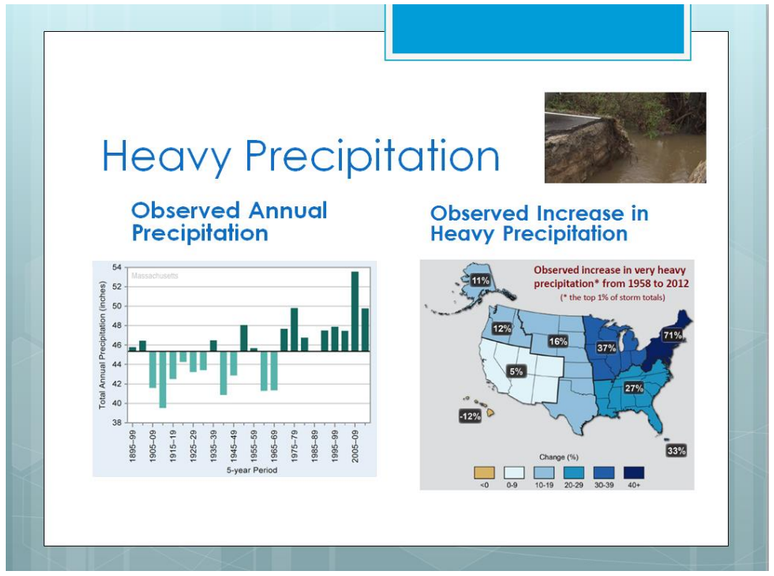
## WORKSHOP PRESENTATION

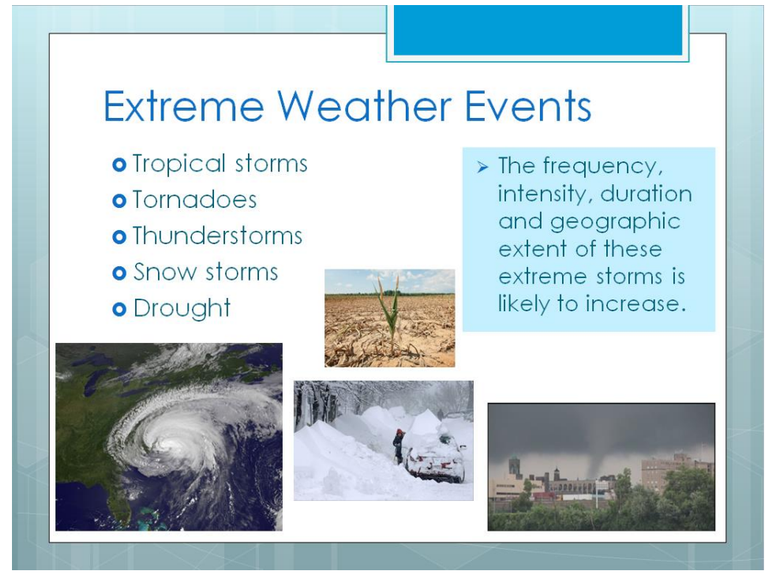






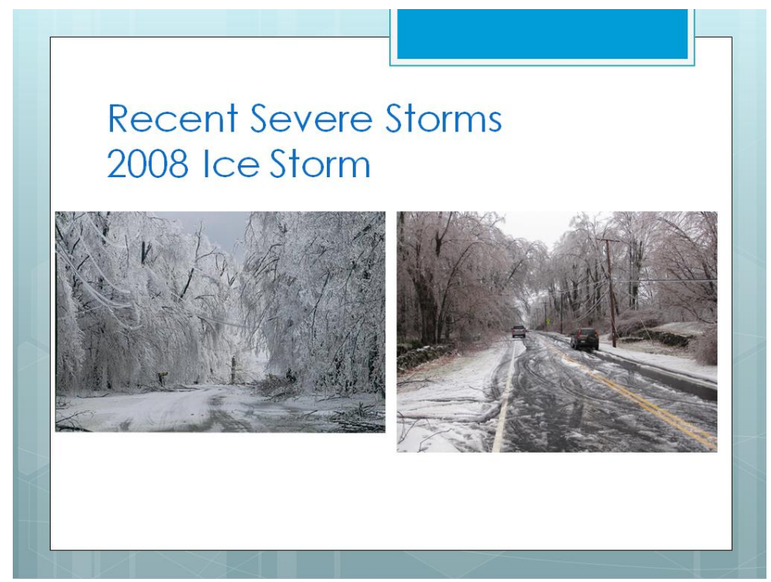



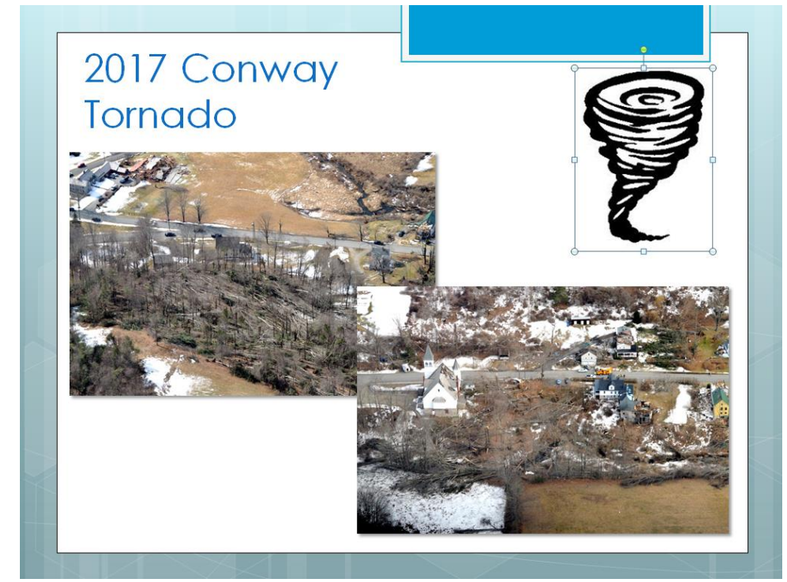

Heavy Precipitation
Observed Annual Precipitation
Observed Increase in Heavy Precipitation
Massachusetts
Total Annual Precipitation (inches)
5-year Period
Observed increase in very heavy precipitation* from 1958 to 2012
(* the top 1% of storm totals)
11%
12%
16%
37%
71%
5%
27%
-12%
33%
Change (%)
<0
0-9
10-19
20-29
30-39
40+


Extreme Weather Events
Tropical storms
Tornadoes
Thunderstorms
Snow storms
Drought
The frequency, intensity, duration and geographic extent of these extreme storms is likely to increase.

Greenfield: 2.59"
Orange: 2.78"
News Flash! October 30, 2017
Heavy rains bring flash flood warnings and high winds knock out power to thousands. Roads flood ……
Pictures by Recorder Staff/Paul Franz. 10/3102017 Online edition
http://www.recorder.com/Road-closures-and-power-outages-Monday-morning-from-flooding-and-winds-13427474

Recent Severe Storms
2008 Whately Microburst


Recent Severe Storms
2008 Ice Storm


2017 Conway
Tornado

## Recent Severe Storms
## 2011 Tropical Storm Irene

## Snowtober!!! 2011 Historic Nor'easter

Making tracks
Cross country team runs 26-hour relay to raise money.
PAGE B1

Pumpkin toss
Smashing pumpkins draws crowd to help flood victims.
PAGE C1

WEATHER 48/31 SUNNY Full forecast PAGE A2

THE RECORDER
Serving the people of Franklin County and the North Quabbin Region
recorder.com
1792
MONDAY OCTOBER 31, 2011

**Snowstorm slams region**

Thousands without power

By DAVID RAMSDALE
Recorder Staff

To Our Readers

See STORM Page 3A

THE RECORDER
Serving the people of Franklin County and the North Quabbin Region
recorder.com
1792
WEDNESDAY NOVEMBER 2, 2011

**Storm recovery slow**

Widespread tree damage hampers line repairs

Recorder Staff

■ Storm

See STORM Page A3

THE RECORDER
Serving the people of Franklin County and the North Quabbin Region
recorder.com
1792
TUESDAY NOVEMBER 1, 2011

**Area cold seek shelter**

Residents flock to Turners high school

CHRIS CURTIS
Editor Staff

■ **Shelter:** People get warm, charge devices

From Page A1

THE RECORDER LOCAL
recorder.com
• TALK OF THE TOWNS • NATIONAL/WORLD NEWS
WEDNESDAY NOVEMBER 1, 2011 — PAGE C1

**100 percent of Gill still without power**

By CHRIS CURTIS
Recorder Staff

## Buckland Multi-Hazard Mitigation Plan 2013

- Inventoried *historic* hazard events – frequency, magnitude and damages
- Vulnerability assessment for flooding was prepared based on damages from *past* events and location in 100 year floodplain
- Prioritized all hazards and included action items for each hazard

## 2013 Multi-Hazard Mitigation Plan
### Hazard ID & Vulnerability Assessment

DONE!

| Potential Hazards Identified for Buckland |
|---|
| Dam Failure |
| Severe Winter Storm/Ice Storm |
| Earthquake |
| Hurricane |
| Wind Storms, Microbursts, etc. |
| Tornado |
| Ice Jam |
| Flood |
| Wild Fire/Brush Fire |
| Landslide |
| Drought |
| Man-made Hazards |
| Temperature Extremes |

A changing climate is exposing us to greater risk.

Action Items for most of these hazards were also developed

## Workshop Agenda

- **Identify Past, Current and Future Hazards**
- **Determine Top Priority Hazards**
  - Which 4 hazards pose the greatest threat to the town currently and in the future?
- **Brainstorm resiliency actions for Infrastructure, Societal and Environmental vulnerabilities.**
  - Examples:
    - Upgrade culverts, flood-proof drinking water supplies
    - Evacuation drills and extreme weather communications protocols to protect vulnerable populations
    - Protect wetlands and floodplains to improve flood resiliency
- **Determine top priority Resiliency Actions for Buckland**

## Infrastructure

A changing climate is exposing us to greater risk.

**What is it?**

- Roads
- Power grid
- Drinking Water
- Wastewater Treatment
- Communications
- Housing
- Emergency Response
- Schools

**Vulnerabilities**

- Increase in Precipitation and Extreme Storm Events
- Damages from Flooding, Wind Storms, Snow/Ice Storms

## Expected Impacts from Higher Temperatures

### Infrastructure

Energy
- Increased demand will strain energy infrastructure
- Disrupt service (potential for widespread brownouts or blackouts)

Transportation
- More frequent maintenance required to address:
  - deterioration of asphalt roads
  - buckle railroad tracks
  - thermal expansion of bridges

## Societal (Buckland Residents)

A changing climate is exposing us to greater risk.

### What is it?

- Availability of health care services
- Access to lifelines (food/water, emergency response personnel, etc.)
- Support networks that connect and maintain the supply of goods and services to vulnerable populations.

### Vulnerabilities

Vulnerable populations
- Elderly
- Low/moderate income
- Special needs
- Languages spoken

## Environment

A changing climate is exposing us to greater risk.

### Natural Resources

- Deerfield River
- Coldwater streams
- Forests
- Floodplains
- Habitat
- Wetlands
- Aquifers

### Climate Stressors

- Flooding
- Erosion
- Impacts to water quality and quantity
- Loss of species diversity
- Invasive pests and plants
- Wetland soils become less absorptive
- More stormwater runoff, less groundwater recharge

### Vulnerabilities?

## Let's Get Started!

- Complete Workshop
- Compile Information in a Summary Report
- Follow-up Meeting with the Town
- Review of Funding Sources