



Town of Leverett



Municipal Vulnerability Preparedness (MVP) Program

MVP Resiliency Plan

Draft: November 2020

Facilitated by the
Franklin Regional Council of Governments
A State-Certified MVP Provider



MVP Resiliency Plan

Including the Summary of Findings from the
Community Resilience Building Workshop

October 2019

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Town of Leverett

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 in Franklin County, such as Tropical Storms Irene and “Snow-tober”, have reinforced this urgency and compelled communities like the Town of Leverett to proactively plan and mitigate potential risks. This type of planning will reduce the vulnerability of Leverett’s people, infrastructure and natural resources, and will empower Leverett’s officials and citizens to take steps to protect themselves and their community.

In the early spring of 2019, with funding from the Massachusetts Executive Office of Energy and Environmental Affairs, the Franklin Regional Council of Governments (FRCOG) offered the Town of Leverett 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 Leverett engage in a community-driven process that brought together climate change information and local knowledge to conduct the workshop, whose central objectives were to:

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

This report summarizes the findings of the Town of Leverett’s Community Resilience-Building Workshop.

Community Resilience Building Workshop

Summary of Findings

The Town of Leverett, population 1,876, has conducted a number of planning projects in previous years, including its 2014 Hazard Mitigation Plan, which enabled the Town to identify high priority hazards as well as areas, infrastructure and populations vulnerable to a variety of hazards, and action items to potentially address hazards. Other recent Leverett plans include: 2019 Capital Plan, 2019 Open Space and Recreation Plan, 2018 ADA Self Evaluation & Transition Plan, updated Emergency Action Plans, 2016 Community Development Strategy, Green Communities Energy Reduction Plan, and a 2010 Forest Management Plan.

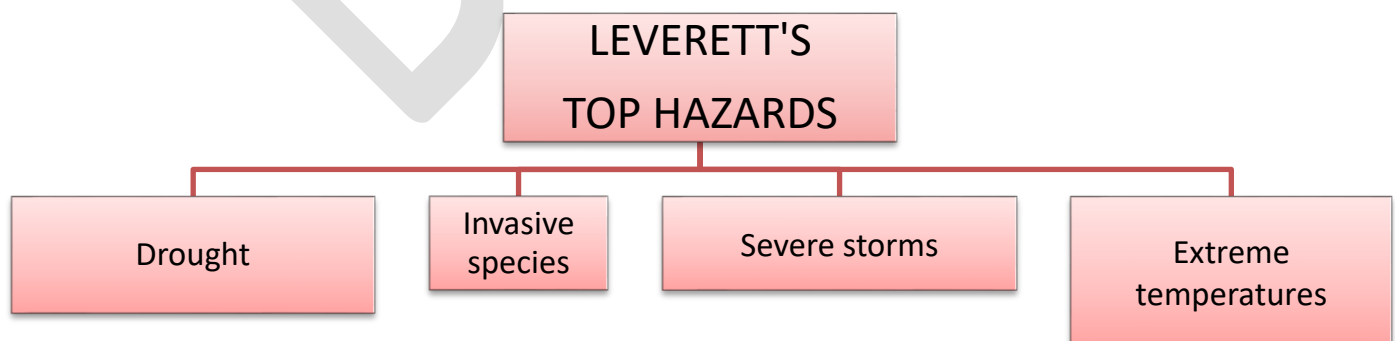
In spite of Leverett's diligence in completing these planning efforts, there was still a need for the community to conduct a hazard assessment across scales – from individual buildings and bridges to rivers and landscapes, and across sectors – infrastructure, society and environment – looking specifically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

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

The workshop was critical to enabling participants to think about and engage with people from different sectors. People representing public health, planning, fire, water pollution control, and several others came together to determine the most threatening hazards to the Town of Leverett and to agree upon high priorities and actions to address them.

Top Hazards

Workshop participants discussed a number of hazards that impact Leverett, 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

Infrastructure and buildings: Vulnerable power grid, with widespread power outages occurring after one cut to the system; poor cell phone coverage throughout Town; roadside trees; emergency communication infrastructure; culvert on Route 63; closed or failing bridges, Lake Wyola dam; private dam on Dudley Pond; three phase electric power

Transportation: Many unpaved roads with poor drainage; flooding on Route 63 from Long Plain Brook; emergency access routes; impassable roads during winter months; ice jams and flooding on Teawaddle Hill Road; flooding on Briggs Road and Dudleyville Road



Localized flooding frequently occurs on Route 63

Public sanitation and water:

Residents on private wells without a backup water supply in the event of a power outage; Lyme disease and mosquito borne diseases; landfill pollution plume and contaminated wells on Teawaddle Hill Road

People: Emergency communication systems throughout Town due to several dead zones

Ecosystems and natural resources: Invasive species such as the hemlock wooly adelgid, Japanese knotweed, and Eurasian milfoil; dead brush in local forests; steep slopes; beaver dam flooding near Williams Brook/Richardson Road and throughout Town; overgrown vegetation on Long Plain Brook near Bull Hill Road

Current Concerns & Challenges Presented by Hazards

Participants in the workshop discussed a number of hazards, both natural and humanmade which have impacted the community in recent years. Short-term, acute weather events including severe rain and snow storms, ice and wind are of the most concern for participants.

For many in Franklin County, Tropical Storm Irene in 2011 is a bellwether event, demonstrating the extent and severity of extreme weather and increased rain that is predicted to become more frequent in the coming years. Although Leverett was not impacted nearly as severely as towns to the west, the damage and extreme impact from Irene was felt throughout the region.

Workshop participants expressed concern about heavy rain events and potential future flooding, particularly with the rise of wetlands caused by beaver dams throughout the Town. Heavy snow, ice and wind events were also identified as a top hazard, due to the potential for downed trees and widespread power outages. Blocked emergency access routes were also a primary concern, especially with regard to how these events can delay emergency responders and affect the community during moments of emergency. Even though most people in Leverette are accustomed to severe winter weather, such events can still have broad and significant impacts on the Town.

Temperature extremes, such as high heat and freezing temperatures were another top concern. Elderly, low income, and homeless residents are particularly vulnerable to extreme temperatures and may lack air conditioning or safe ways to adequately heat their homes. Periods of extended high heat or extreme cold may strain the already vulnerable electrical grid in town. Public health concerns related to extreme temperature included increased disease. Additionally, unpaved roads throughout the town are impacted by extreme temperature changes due to

Participants also identified manmade hazards as a top concern, particularly culvert failure and bridge failure. Additionally, fragmented communication networks also pose a threat for safe and timely evacuations during an emergency.

Specific Categories of Concerns and Challenges

Vulnerability of roads, bridges, and culverts: Many roads throughout Leverett are unpaved and do not have sufficient drainage. This is not a historical issue – residents have been accustomed to roads freezing from November to April – but that is no longer the case as seasonal temperatures change and roads are freezing less. Temperature swings in the winter months now cause the roads to become muddy, churned, and increasingly difficult to traverse. Dudleyville Road was closed for a couple of days in Spring 2019 due to this issue. The Town of Leverett cannot pave the roads, so solutions will need to focus on minimizing the amount of water on unpaved segments. Participants acknowledged that road damage will continue to be of great concern.

Bridge closures were also high on participant's list of concerns. Bridges across Town often go out when there is severe weather. These closures can block off the already limited number of emergency access routes available to responders and residents. The closure of the bridge on Old Coke Kiln Road was noted as a specific concern by participants.

Vulnerability of infrastructure: The power grid in Leverett is intrinsically vulnerable. Workshop participants noted that widespread outages occur if as little as one line or pole is knocked down, and explained that if the system is damaged on Bull Hill Road approximately two-thirds of the town can lose power. Participants also noted cuts to the system on Bull Hill Road and Depot street will knock out communication lines. Tree hazards were noted as a primary threat to the grid, but participants mentioned conditions are improving in some areas because Eversource is changing cutting patterns for the installation of three phase power. However, aggressive cutting is still needed throughout Town.

Participants discussed the possibility of installing additional cell towers in order to strengthen communication avenues, but cited past studies that concluded Leverett's topography would prevent a successful expansion of service. As of March 2020, one cell tower is being installed in Town, which should help to increase Verizon coverage.

A lack of three phase power was also brought up as an infrastructural vulnerability. The Town currently does not have three phase (industrial grade) power. The addition of this type of power in town would greatly benefit public safety, and would also allow for more opportunities with regard to charging stations for electric cars.

Uncertainty of water supplies during hazards or power outages: Leverett's residents are dependent on private wells for all their water needs, as there is no public water supply system. Periods of prolonged drought can affect residents; private wells have run dry in the past. Participants recalled a 5 year long drought in the 1960s, which was severe enough to lower water levels in the Quabbin Reservoir by 40 feet and cause many of the wells in Leverett to go dry.

An adequate water supply is also a concern during power outages because the wells run on electricity, so residents would be without water, unless an emergency water supply or backup

power system was established. During the workshop, participants identified artesian wells located throughout Town that could potentially be used as a backup supply during a power outage. These wells did not run dry during the drought in the 1960s, so they are believed to be a reliable source of water. Participants also discussed how to make sure residents have a local backup supply of water after identifying the need for a water resiliency plan.

Vulnerability of water supplies to contamination: Although it is beneficial for residents to have their own water supply, there are some concerns about the contamination of individual water supplies. Four homes are currently affected by a contamination plume coming from the Town's landfill, and future increases in the intensity and frequency of flooding events may pose similar threats to the aquifer. Beaver dams found throughout Leverett also pose a threat to a clean water supply, as the dams are creating small wetlands that subsequently capture stormwater. Several residents in Leverett have reported contaminated wells and suspect that it is caused by beaver dams.



A workshop participant prioritizes resiliency actions.

Sheltering of Residents:

Participants raised concerns about options for sheltering during periods of extreme temperatures. The Mount Toby meetinghouse could be used as a cooling shelter, but is not officially designated as a shelter where residents could stay overnight during an emergency. Further, Mount Toby is not an ideal location for sheltering because it is connected to a septic system. Participants discussed the North Leverett Baptist Church as a potential option for sheltering, but is not a viable

option due to similar concerns. The Leverett Village Coop is able to serve as a designated heating and cooling shelter for residents in North Leverett, and they are working on obtaining a backup generator to preserve their food stock and help residents during an emergency. Based on the discussion about shelters at the workshop, Town Officials determined there is a need to develop a sheltering guide for the Town, which would provide specific information about when a sheltering location would open.

Sheltering was also a concern to workshop participants due to the lack of communication networks in town. Residents discussed how it is very difficult to get in touch with everyone in town in the event of an emergency, and were concerned that the emergency communication system doesn't have up to date information.

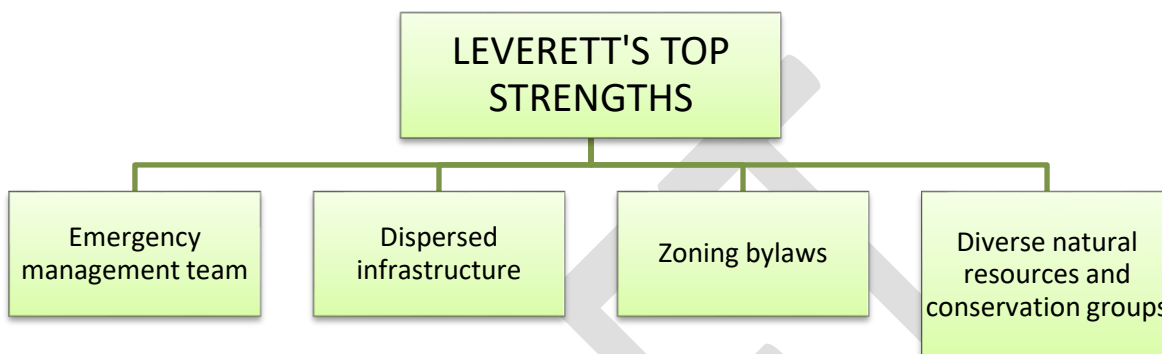
Vulnerability of residents to flooding: Several areas in Leverett are prone to flooding, and workshop participants voiced concerns about areas that may worsen over time. Route 63 is particularly prone to flooding due to a vegetation issue in Long Plain Brook, and flooding on this road has recently caused many accidents. The Army Corps of Engineers was noted to previously dredge the Brook, but since they have stopped flooding has become a larger issue.

Invasive species and insect borne diseases: The hemlock wooly adelgid is an invasive species of particular concern in Leverett, as it has already caused extensive damage to hemlock trees throughout Town. As previously discussed, tree damage is a threat to Leverett's power and communication lines, and fallen trees due to invasive species may further exacerbate the issue. Fallen trees due to the hemlock wooly adelgid are hazardous even when not in proximity to power lines, because they may serve as biofuel during a wildfire. Participants noted the forest on Brushy Mountain is well maintained for invasives, but non-working forests throughout the Town are at the greatest risk of wildfires. An increase in insect borne diseases, such as Lyme disease, was also voiced as a concern by several workshop participants.

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Current Strengths and Assets

Leverett 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 Leverett 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 cited several strengths and assets that help keep their community resilience in the face of climate change and other challenges. They include:



Societal strengths and assets: These include Leverett's informal community leaders, neighborhood groups and communication networks. Participants said that there is a strong sense of community in the Town, and neighbors are always willing to help each other out during emergencies. Workshop participants also discussed the possibility of developing self-organized warming shelters within neighborhoods so residents don't have to travel far during winter emergencies. The Town also sends out robocalls during emergencies to ensure residents are well informed of any precautions they need to take. Additionally, Leverett has an active Emergency Management Committee, which is a useful resource for the Town during hazards. This Committee is known to communicate with residents, run shelters, visit residents who might need help during an emergency, and respond quickly and efficiently to resolve problems.

Dispersed infrastructure: Each household in Leverett has its own septic and water system, which helps to prevent widespread outages of necessary infrastructure. The Town's records are all digitized, and the Town Administration is currently working on setting up an automatic backup program that will sync the Town's data once every hour.

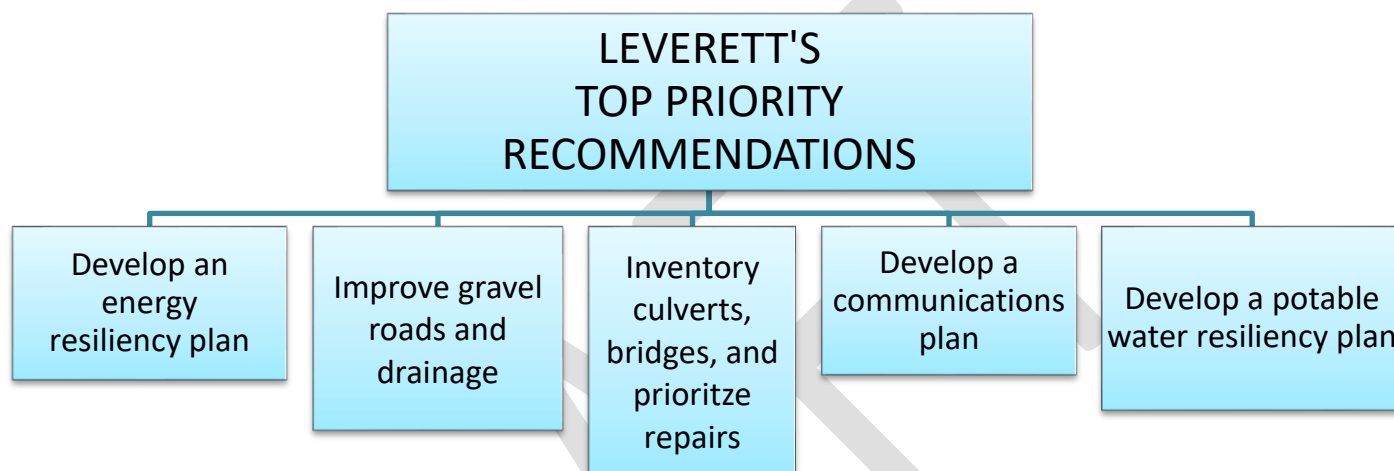
Zoning bylaws: Leverett's current zoning bylaws encourage resiliency, as industrial and commercial zoning is not allowed. These bylaws help to reduce the possibility of the Town's water supply being contaminated.

Diverse Natural Resources and conservation groups: Workshop participants noted that there are many protected open spaces throughout the town. Also, there are several active conservation groups in the town, such as the Friends of Leverett Pond, the Rattlesnake Gutter

Trust, and the Conservation Commission. All of these groups help to advocate and protect open space in Leverett.

Top Recommendations to Improve Resilience

Leverett's top priority recommendations, shown below, address key vulnerabilities while building upon current strengths.



Developing an energy resiliency plan topped the list of a highest priority recommendation, with workshop participants agreeing that reinforcing the power grid is essential.

Improving gravel roads and drainage is also a top priority recommendation, especially in order to ensure the availability of emergency access routes.

Conducting an inventory of culverts and bridges is a high priority recommendation. Workshop participants suggested a study on culverts in Leverett previously conducted by UMass Amherst could be used as a starting point for the inventory.

Developing a communications plan is essential for the Town of Leverett. Cell phone service is extremely limited throughout Town, which increases the vulnerability of isolated residents to hazards. The Town should develop a plan to prioritize and conduct infrastructure improvements.

Developing a potable water resiliency plan should be considered a top priority recommendation. Actions suggested by workshop participants include determining the locations of artesian wells throughout Town or installing microgrids to limit the number of residents who lose power and the ability to pump water.

**Community Resilience Building
Risk Matrix**



Top Priority Hazards

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/ S	Recommendations	Flooding	Extreme Temperatures	Fire	Drought	Priority H - M - L	Time S hort L ong O ngoing
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Infrastructural

Gravel Roads	Town-wide	Town	V/S	Many of the gravel roads throughout town, such as Dudleyville Road are deteriorating. A drainage assessment should be completed to determine ways to prevent flash flooding on these roads. The Town has already developed a Gravel Roads Committee to work on some of these issues and develop a long range plan. The Committee will work to prioritize solutions, and determine the most cost effective options.	X	X			H	O
Vegetation build up along roads	Town-wide	Town/State	V	Some roads in Town are overgrown with vegetation, which is subsequently causing the roads to flood. The Town is aware of competing regulations that prevent this problem from being fixed quickly. The Conservation Commission and Town should continue to work together to address this issue.	X		X		H	S
Zoning bylaws	Town-wide	Town	V/S	The Town should continue reviewing zoning bylaws and revising them as needed in order to encourage climate resiliency, balance affordability, and diversify the Town's tax base.		X		X	H	S
Culverts	Town-wide	Town	V	Inventory and prioritize culverts throughout Leverett in order to determine which should be repaired. The Town will have a culvert assessment completed by the FRCOG in 2020. Drainage ditches along the roadways should be included in the assessment.	X				H	S/O
Bridges	Town-wide	Town-wide	V	Fix and upgrade bridges throughout town, especially those that are on	X	X	X		H	S/O

**Community Resilience Building
Risk Matrix**



Top Priority Hazards

H-M-L priority for action over the **Short** or **Long** term (and **Ongoing**)

V = Vulnerability

S = Strength

Features	Location	Ownership	V/ S	Recommendations	Flooding	Extreme Temperatures	Fire	Drought	Priority	Time
									H - M - L	Short Long Ongoing
				emergency access routes used by residents and emergency responders.						
Tree Hazards	Town-wide	Private/Town	S	Eversource routinely removes tree hazards throughout Leverett, but the cutting program could be expanded to further mitigate hazards.	X		X		M	O
Power supply	Town-wide	Private/Town	V	An energy resiliency plan should be developed, which should include a feasibility assessment of microgrids and/or three phase power.	X	X	X	X	H	S/L
Water resiliency	Town-wide	Private	V	A potable water resiliency plan should be developed to ensure residents have access to water in the event of an emergency. This plan could include inventorying possible sources of water for fire suppression.	X	X	X	X	H	S
Dry hydrants	Mill Pond, throughout Town	Town	S/V	There are 3-4 dry hydrants located throughout Leverett. However, silt is clogging some of the hydrants. The hydrants should be periodically cleared.			X	X	L	O
Societal										
Emergency contact system	Town-wide	Town	S	Continue to raise awareness about the emergency contact system and get more residents to sign up for the program. The Town currently uses Blackboard Connect, but is looking into alternatives that will allow for more effective emergency communications.	X	X	X	X	H	O
Emergency Response Communication Systems	Town-wide	Town	S	Fire and police staff in Leverett use Verizon network extenders to maintain access to the internet in the event of a power outage. The Town strongly supports the installation of additional cell towers and Wi-Fi boosters to increase access for all residents.	X		X		M	O

**Community Resilience Building
Risk Matrix**



Top Priority Hazards

H-M-L priority for action over the **Short** or **Long** term (and **Ongoing**)

V = Vulnerability

S = Strength

Features	Location	Ownership	V/ S	Recommendations	Flooding	Extreme Temperatures	Fire	Drought	Priority	Time
									H - M - L	Short Long Ongoing
Emergency planning public education	Town-wide	Town	S/V	Continue to educate the public on emergency plans, such as sheltering in place. The focus should be on educating all residents, and not just vulnerable populations.	X	X	X	X	H	O
Public information outreach	Town-wide	Town	S	Continue public information outreach initiatives started by the Board of Health to educate residents about the insect borne diseases.		X			H	O
Sheltering Plan	Town-wide	Town/Private	S/V	Review and expand the current sheltering plan to include warming/cooling centers. Cooling centers are a current gap and should be a focus of the review. Public education and outreach should be conducted to provide better information about the Town's sheltering plan. The Town should develop a brochure to explain the resources available at each shelter and what would trigger activation.	X	X	X		H	S

Environmental

Insects and pests on farms	Regional/ Town-wide	Private	V	Join the regional mosquito district, or form one locally. Determine where urban gardens and pollinator habitats could be installed.			X		M	O
Lyme disease	Regional	Town	V	Conduct public education and outreach about Lyme disease.		X			L	O
Protected open space	Town-wide	Private/Town	S	There are many large areas of protected open space in Leverett. Additionally, W.D. Cows actively works to remove hemlocks damaged by wooly adelgid, which helps to decrease the risk of wildfires in local forests.	X	X	X	X		

**Community Resilience Building
Risk Matrix**



Top Priority Hazards

H-M-L priority for action over the **Short** or **Long** term (and **Ongoing**)

V = Vulnerability

S = Strength

Features	Location	Ownership	V/ S	Recommendations	Flooding	Extreme Temperatures	Fire	Drought	Priority	Time
									H - M - L	Short Long Ongoing
Aquatic plants management	Leverett Pond	Town	V	Aquatic species management is needed at Leverett Pond.	X				L	O
Local forests	Town-wide	Public/Private	S/V	Climate resiliency forest practices should be adopted for town land and privately owned land. Education and outreach should be arranged for private landowners and businesses.	X	X	X	X	H	O
Beaver dams	Town-wide	N/A	V	A comprehensive beaver inventory should be completed, in addition to a comprehensive management plan.	X		X		H	O



Highest Priority Recommendations

- Work with a consultant to review zoning bylaws to encourage climate resiliency and incorporate findings from the MVP and Hazard Mitigation Planning processes into the zoning review.
- Improve drainage on gravel roads throughout Town.
- Develop an energy resiliency plan for Leverett, which could include a feasibility study for a microgrid.
- Create a communications plan for the Town. A plan should be made for infrastructural improvements and a village level plan to ensure residents have a way to communicate with one another during emergencies. Continue to enroll residents in the Town-wide emergency contact system.
- Review existing sheltering plan and update to include warming and cooling shelters. Investigate private/public agreements with businesses and community members.
- Develop climate resilient forestry practices for Town owned land and privately owned land.
- Evaluate and implement nature based solutions to increase flood resiliency on Long Plain Road and Teewaddle Hill Road.
- Inventory culverts, bridges, and roads and prioritize climate resilient solutions based on need.
- Develop a potable water resiliency plan.
- Inventory current beaver activity and develop a comprehensive management plan.

Moderate Priority Recommendations

- Join the regional Mosquito District.
- Install additional cell towers and Wi-Fi boosters to increase access for all residents.

Lower Priority Recommendations

- Routinely remove aquatic species from Leverett Pond.

- Develop a public education program that covers insect borne diseases.
- Periodically clear the dry hydrants in Town in order to ensure they are usable during an emergency event.

CRB Workshop Participants: Department/Commission/Representative:

Gail Berrigan, Leverett Conservation Committee
Jeff Baily, Leverett Elementary School
Andrew Smith, MA Executive Office of Energy and Environmental Affairs
Sharon Raskevitz, Leverett Cemetery Association
Joseph Raskevitz, Leverett Cemetery Association
Natalie Halasz, Leverett Library
Susan Nagy, Leverett Emergency Planning Board
Mike Fair, Board of Health
Jim Field, Emergency Management
Tom Hankinson, Select Board
Susan Mareneck, Historical Commission
Scott Minckler, Police Chief
Matt Boucher, Highway Department
John Ingram, Fire Department
Don Robinson, North Leverett Church/Community Member
Brian Cook, Fire Department
Tom Wolff, Leverett Alliance
Steve Freedman, Planning Board
Cong Chen, Community Member
Nick Bagley, Community Member
Tom Powers, Leverett MLP
Richard Nathhorst, Planning Board

CRB Workshop Project Team: Organization and Role

Town of Leverett

Marjorie McGinnis, Town Administrator
Lisa Stratford, Town Clerk

Franklin Regional Council of Governments:

Kimberly Noake MacPhee, Land Use and Natural Resources Program Manager
Megan Rhodes, Senior Land Use and Transportation Planner
Helena Farrell, Land Use and Natural Resources Planner
Xander Sylvain, Emergency Preparedness Program Assistant
Allison Gage, Land Use and Natural Resources Planner

Recommended Citation

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Photo credits:

Cover	Leverett Pond	Friends of Leverett Pond
Cover	North Leverett Sawmill	Lori Lynn Hoffer

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

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Appendices

Maps

Exercise Outputs

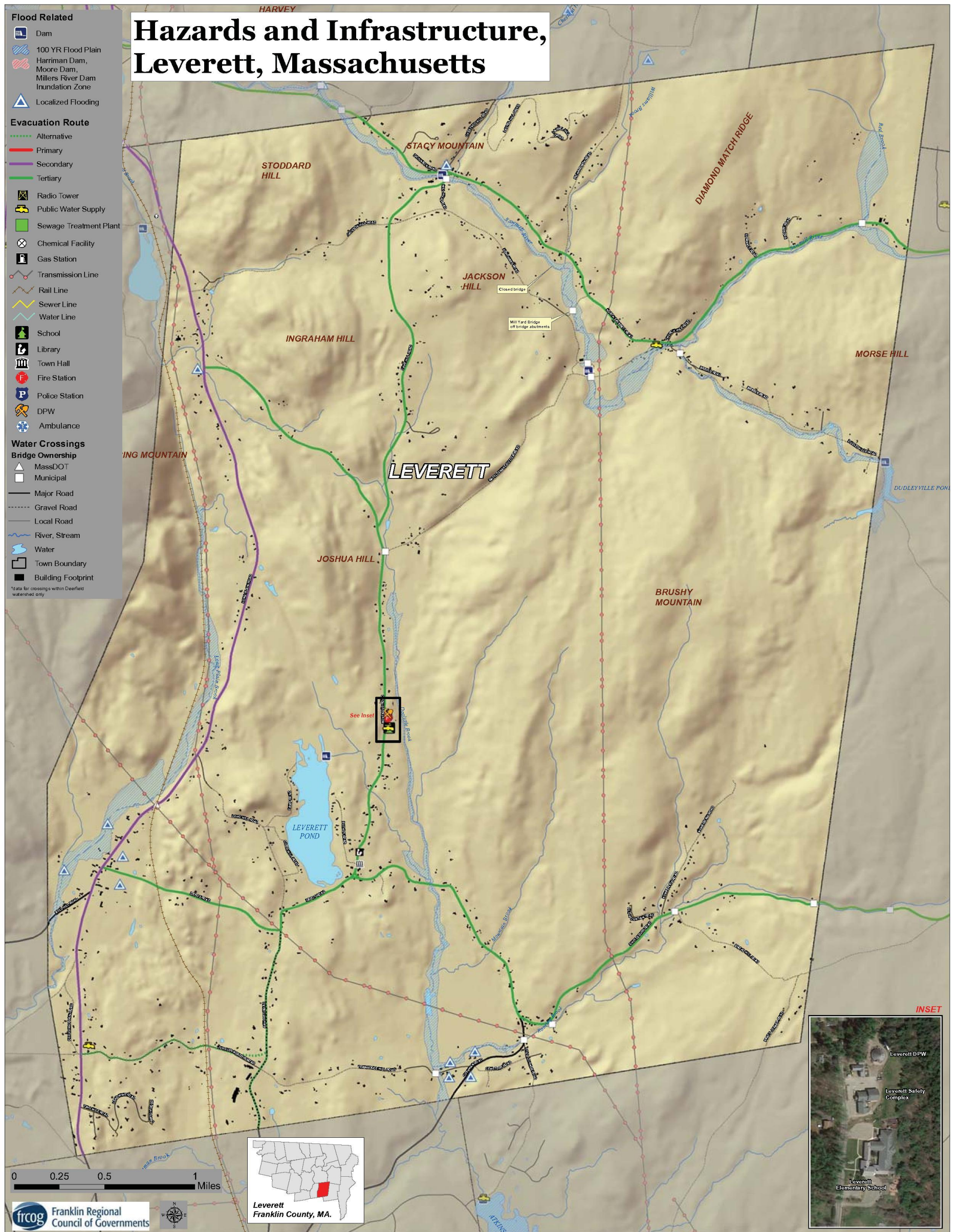
Workshop Presentation

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BASE MAP: Environmental



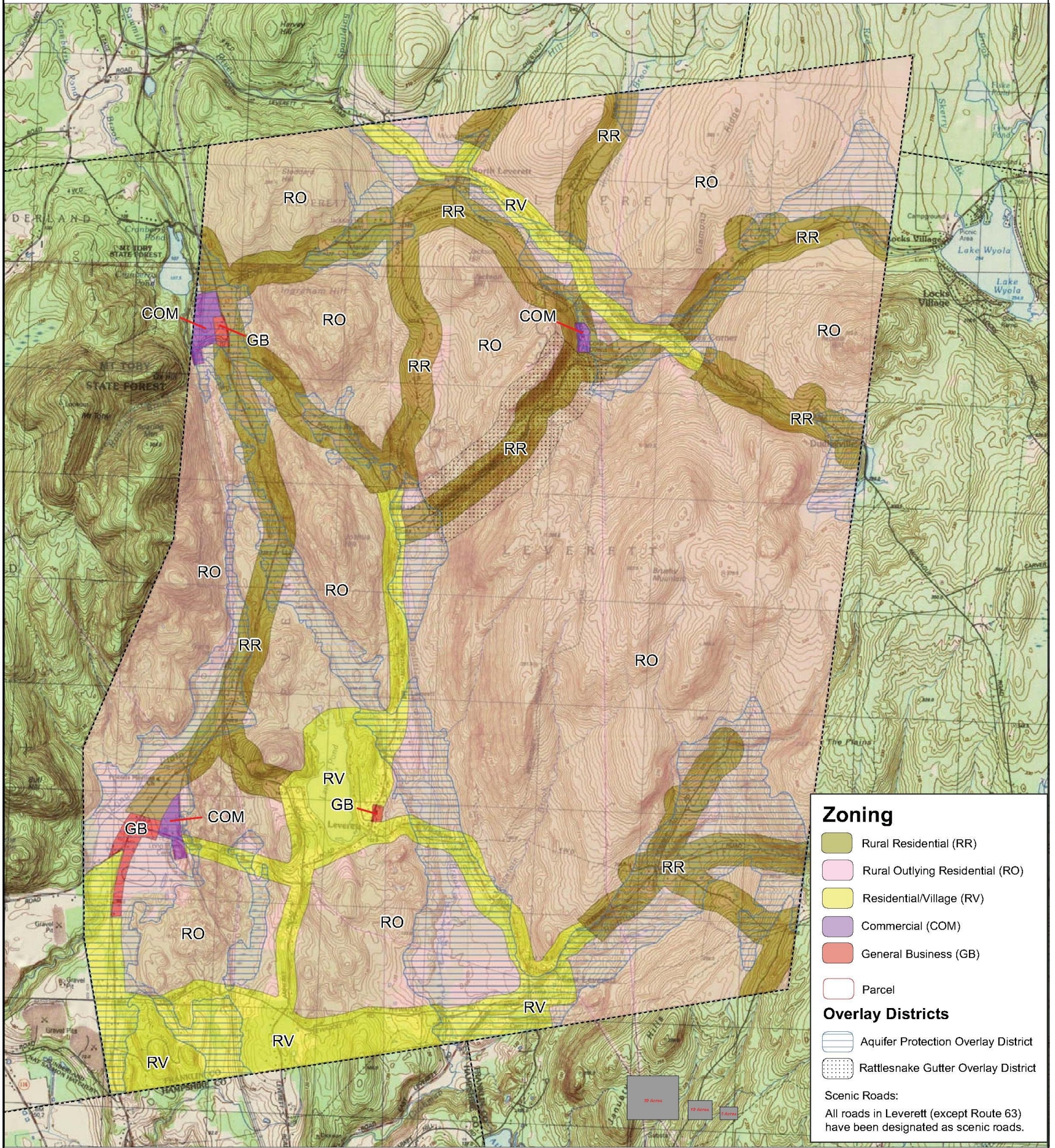
BASE MAP: Infrastructural and Societal



BASE MAP: Zoning

Town of Leverett Official Zoning Map

March 11, 2008



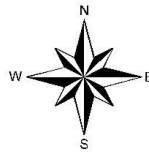
Zoning

- Rural Residential (RR)
- Rural Outlying Residential (RO)
- Residential/Village (RV)
- Commercial (COM)
- General Business (GB)
- Parcel

Overlay Districts

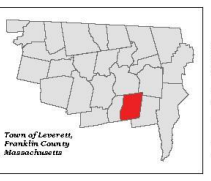
- Aquifer Protection Overlay District
- Rattlesnake Gutter Overlay District

Scenic Roads:
All roads in Leverett (except Route 63) have been designated as scenic roads.



Map Sources:
Map produced by the Franklin Regional Council of Governments Planning Department. GIS data sources include the FRCOG Planning Department, the Massachusetts Highway Department and MassGIS. Digital data obtained from MassGIS represent the efforts of the Massachusetts Executive Office of Environmental Affairs and its agencies to record its location from the accurate 1981-1982 data. The associated documentation, EDIA maintains an ongoing program to update and correct errors in the GIS data and to provide the information in reports. Executive Office of Environmental Affairs, MassGIS EDIA Data Center, 25 Causeway Street, Suite 900, Boston, MA 02114-2500.
USGS 30 minute series topographic quadrangles scanned to create digital USGS 30 minute AVHRR coverages. The resulting map is projected into NAD83 Massachusetts State Plane north. Data provided by MassGIS.
Zoning data provided by the Town.

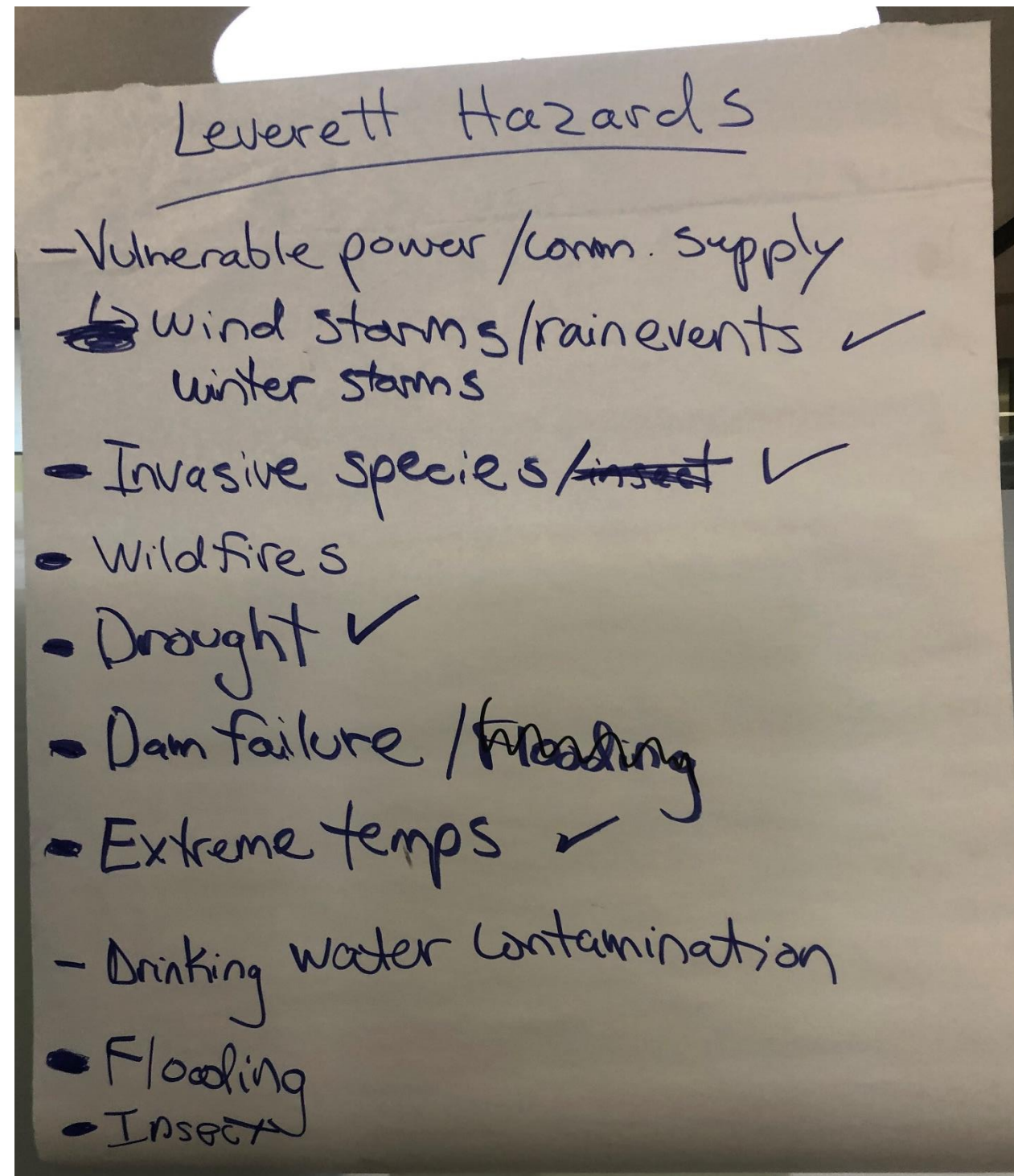
Note: Depicted boundaries are approximate and are intended for planning purposes only. Portions of the source data were obtained from 1:50,000 scale maps. Therefore the accuracy of the data used on this map is +/- 100 feet. The boundaries of the town's zoning districts have been changed by the current Massachusetts Registry Department. Road inventory file. The road inventory file differs from the USGS data in places therefore inaccuracies may exist when using the USGS inventory.



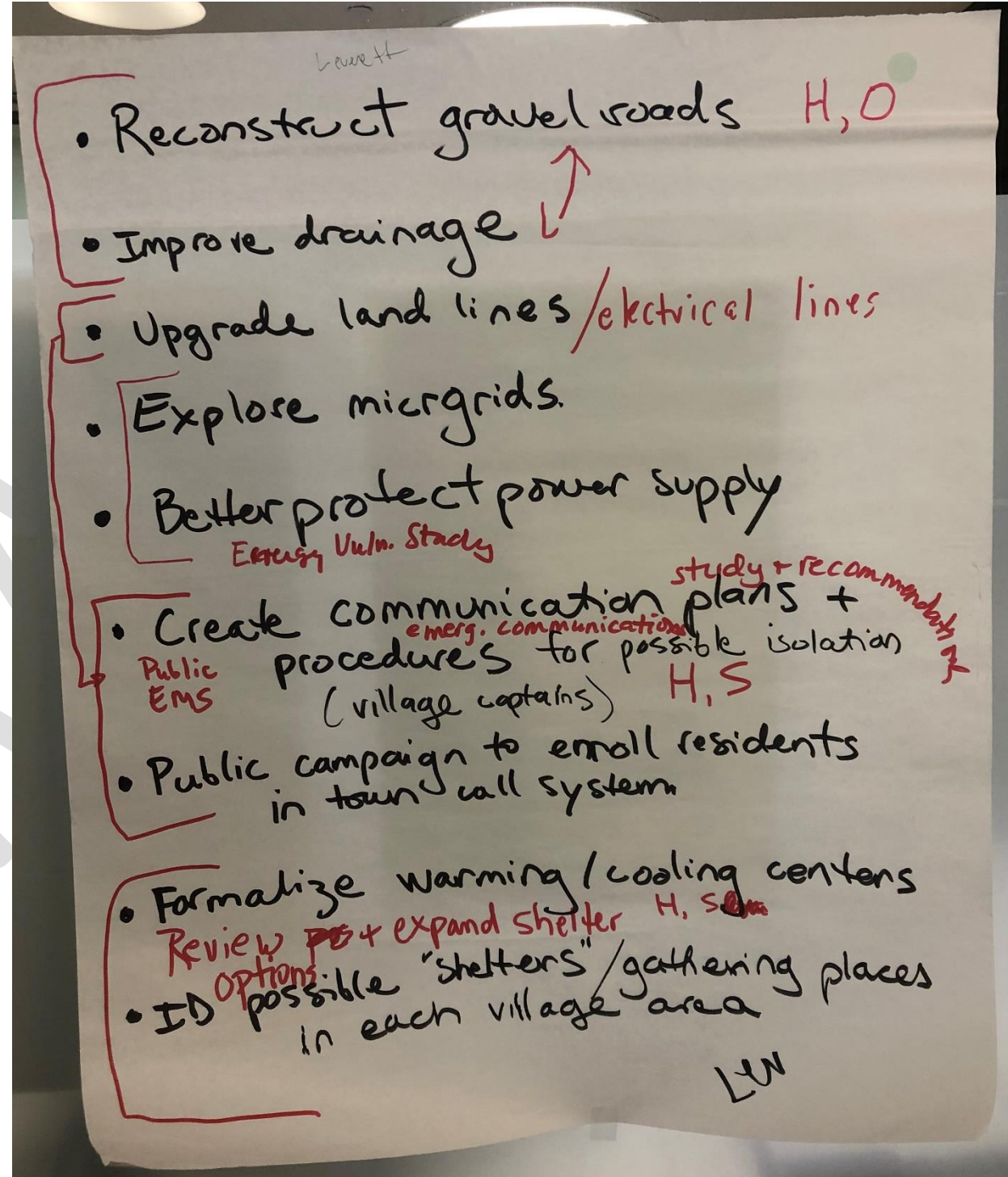
March 11, 2008

EXERCISE OUTPUTS

Top Hazards



Recommendation Prioritization (1 of 4)



EXERCISE OUTPUTS (CONT.)

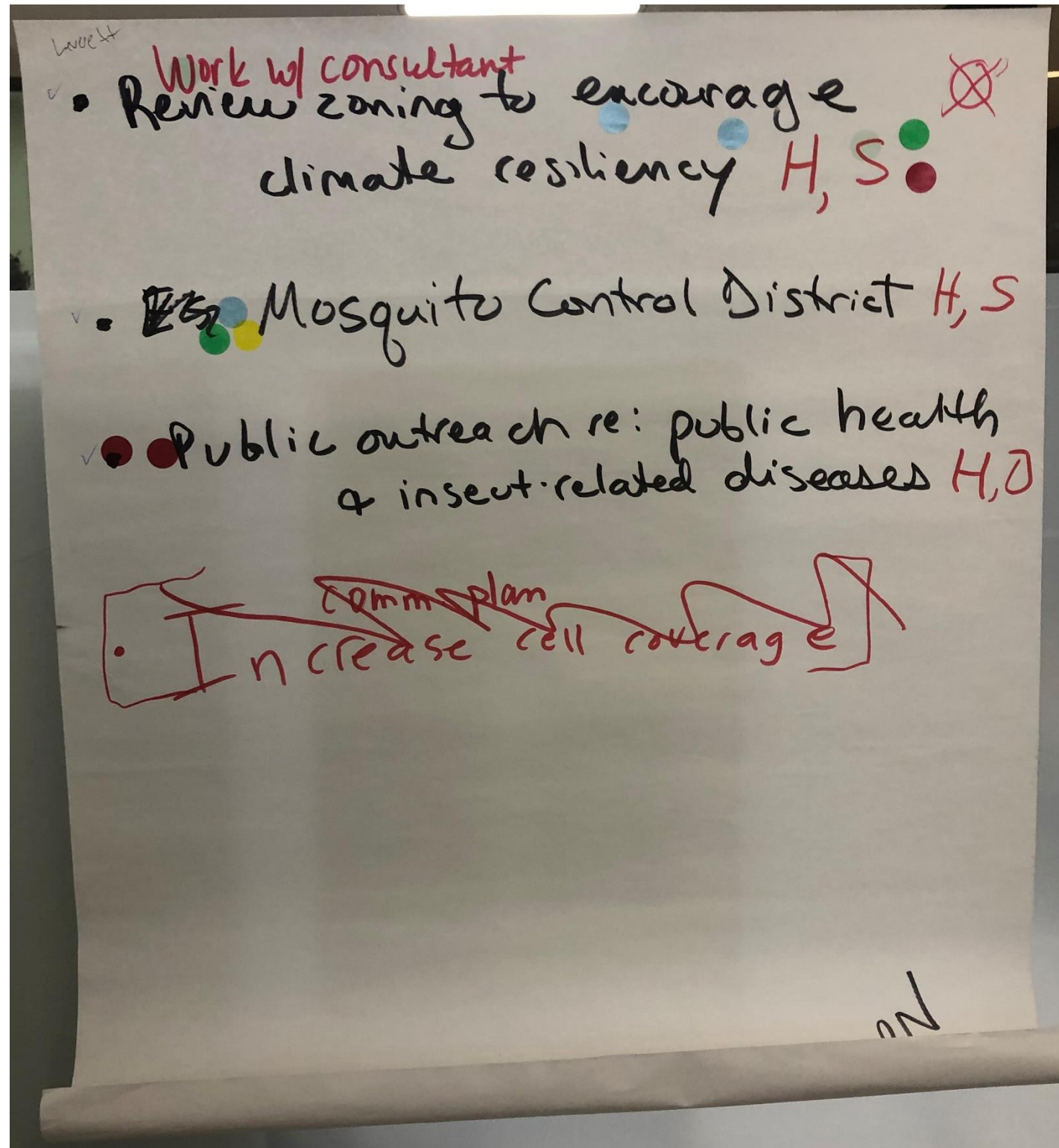
Recommendation Prioritization (2 of 4)

- Determine if town should ^{forestry} manage its lands more _{H, O}
 - Create energy resiliency plan _{H, S}
 - Proactively have Emerg. Preparedness For all residents _{H, O}
 - ~~Inventory elders + vulnerable residents~~
 - Evaluate NBS options Flood resiliency on Long Plain Brook _{H, S} Tea vaddle Road _{evac Route}
 - Inventory culverts + bridges + _{H, S+D} prioritize (Road resiliency)
 - Water Resiliency Plan. (potable) _{H, S}
 - Beaver Inventory + Mgt. _{H, O}
 - Forest Management + education/outreach _{H, O}
- Low

Recommendation Prioritization (3 of 4)

- Improve gravel roads + drainage
 - Improve resiliency + better protect power supply
 - Create communication plan (high level infrastructure improvement) (low local level of talking w/ neighbors)
 - Review + expand shelter plan (include coding/warming centers)
- Low

Recommendation Prioritization (4 of 4)

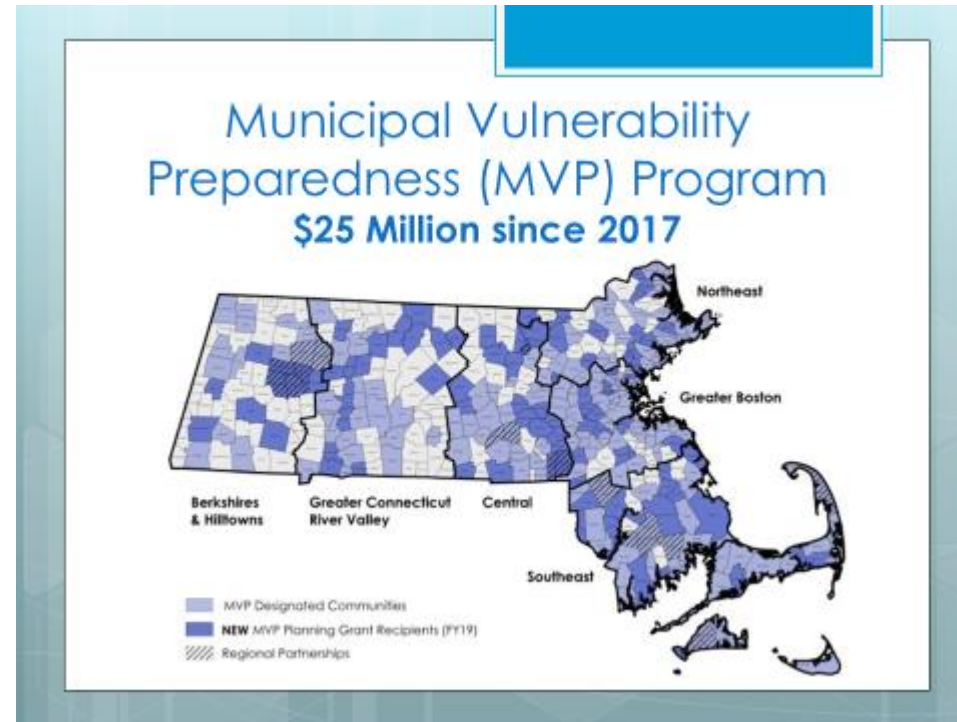


WORKSHOP PRESENTATION

Community Resilience Building Workshop

Town of Leverett

October 23, 2019



MVP Program

- Focuses on climate resiliency
- Strengths & Vulnerabilities in 3 sectors:
 - Infrastructure
 - Societal
 - Environment

Multi-Hazard Mitigation Plan Update

- Inventories *historic* hazard events – frequency, magnitude and damages
- Considers impacts of climate change and probability of *future* events
- Prioritizes *all* hazards and includes action items for each hazard

Project Tasks

- Complete MVP Workshop Activities
- Conduct stakeholder interviews
- Compile Information into a Summary Report
- Listening Session with Town Residents and Stakeholders
- Finalize MVP Report and Request MVP Designation
- Integrate MVP work into Leverett's Hazard Mitigation Plan update

Workshop Process and Outcomes

Build Resilience and Preparedness - to more frequent and intense weather events.

Improve pre-event planning, response & recovery, and long-term actions.

A prepared and resilient town will be able to maintain functions, protect its residents and emerge stronger and better prepared for future storm events and a changing climate.

- Review climate change and natural hazard background information and identify top 4 hazards
- Identify and map vulnerabilities and strengths:
 - Infrastructure
 - Societal
 - Natural resources
- Develop and prioritize actions and clearly delineated next steps

Massachusetts' Changing Climate


- **Changing weather**
 - Higher temperatures
 - Shorter winters
 - More frequent & intense storms
 - Droughts
- **Amplifies existing risks**
 - Community and regional infrastructure
 - Local and regional economies
 - Public health
 - Natural resources and our environment

Goal for Building Resilience to a Changing Climate:

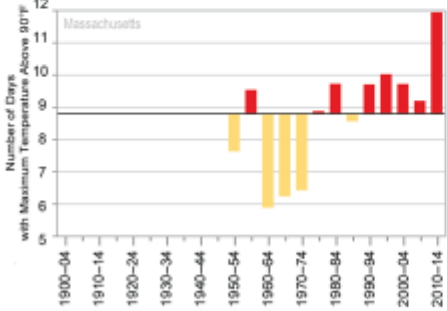
Protect life, property, natural resources and the economy

WORKSHOP PRESENTATION (CONT.)

Higher Temperatures



Change in Observed Number of Extreme Heat Days (>90 degrees)

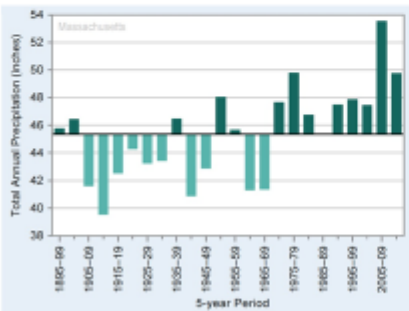


Heat Waves

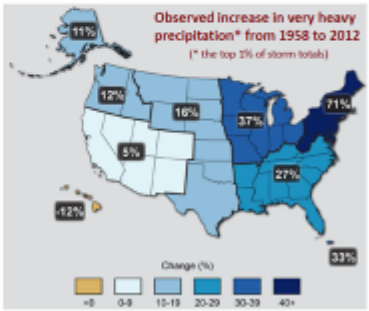
- Number of days >90° are predicted to increase.
- By 2050 - 6 to 25 more days
- By 2100 - 9 to 60 more days

Heavy Precipitation

Observed Annual Precipitation



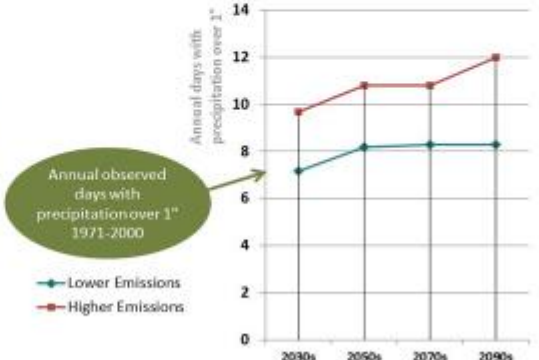
Observed Increase in Heavy Precipitation



Heavy Precipitation

Predictions

By the end of the century, our area could have 5 additional days of rainstorms that dump over 1 inch of rain.



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.





Recent Severe Storms

2008 Ice Storm




2017 Conway Tornado

WORKSHOP PRESENTATION (CONT.)

Recent Severe Storms 2011 Tropical Storm Irene



Snowtober!!! 2011 Historic Nor'easter



100 percent of Gill still without power

By CHRIS CLEGG

More than 100 percent of the town's power lines were down after the storm, according to the town's utility department. The storm hit the town on Wednesday night and continued through Thursday morning.



Area cold seek shelter

Residents flock to Turners high school

By CHRIS CLEGG

Turners High School was packed with people seeking shelter from the cold and wind on Wednesday night.

Recent Severe Storms 2019 Microburst

Microburst wreaks havoc in Deerfield, Montague - The Recorder 7/31/2019

Montague and Deerfield took heavy damage from Tuesday afternoon's storm, with Eversource reporting about 800 power outages from downed trees and utility poles between the two towns.

In addition, the storm damaged crops and greenhouses.






Pictures by Recorder Staff Alan Marcus

October 16, 2019

The storm that brought heavy rain and damaging winds Wednesday night into Thursday morning is being referred to as a "bomb cyclone."

<https://www.wvlt.com/weather/weather-news/what-is-a-bomb-cyclone>

Infrastructure

A changing climate is exposing us to greater risk.

What is it?

- Roads and bridges
- 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, & Extreme Temperatures

Expected Impacts from Higher Temperatures

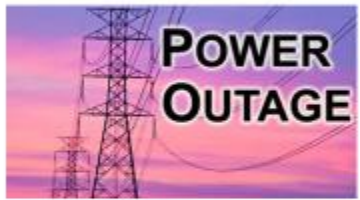

Infrastructure

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

WORKSHOP PRESENTATION (CONT.)

Societal (Leverett 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

Effects of Climate Change on Town Residents (societal)

A changing climate is exposing us to greater risk.

- Heat-Related Illness and Death
- Danger from Storms & Flooding
- Insect-Borne Diseases
- Allergies & Pollen
- Waterborne Disease & Algal Blooms
- Vulnerable populations
- Shelters & services

Health impacts from a changing climate are magnified by individual health issues and circumstances of vulnerable populations



Environment

A changing climate is exposing us to greater risk.

Natural Resources

- Coldwater streams
- Forests
- Farmland
- Floodplains
- Habitat
- Wetlands
- Aquifers

Vulnerabilities

- 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

Let's Get Started!

- **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 Leverett**

Let's Get Started!

Identify past, current, and future hazards

- What hazards have impacted your community?
- Where and how often have the hazards occurred?
- What effects will these hazards have on your community in the future (5, 10, 25 years)?
- What is exposed to hazards and climate threats within your community? For example, roads, elderly, natural resources.
- What have been the impacts to the town's operations and budgets, planning and mitigation efforts?
- Other concerns?

PUBLIC INPUT DOCUMENTATION

Public Outreach

The MVP Planning Committee identified local stakeholders who did not attend the workshop and mailed or emailed a follow up survey. The purpose of the survey was to identify how local businesses or community services have been impacted by natural hazards and what their concerns are as climate change continues to impact the Town. A total of two responses were received and their comments were incorporated into the plan as appropriate. Below is a copy of the survey stakeholders were asked to complete.

Leverett MVP Stakeholder Survey

Instructions: You may complete the survey **online** or by **mail**. Should you respond via mail, please use the enclosed envelope to do so. If you would like to quickly respond online please navigate to SurveyMonkey site via the following link:
<https://www.surveymonkey.com/r/LeverettCS>.

You can also access the survey via the QR code if you use a smartphone. Open your rear-facing camera and hover it above this image and then open the link that pops up:



Thank you for your time!

1. What is your name and the name of your organization?

2. What type of service do you manage?
 - a. Community mental health
 - b. Assisted living
 - c. General community services
 - d. Medical services

- e. Other
3. Extreme weather events in recent years have affected your service in recent years
- a. Not at all
 - b. Somewhat
 - c. Moderate
 - d. Frequent
 - e. Extreme
4. Which hazards have interrupted your service in recent years?
- a. Flooding
 - b. Drought
 - c. Extreme Temperatures
 - d. Invasive Species
 - e. Other
5. Which aspects of your service are the most vulnerable to hazards?
- a. Treatment plans
 - b. Access to clients
 - c. Infrastructure
 - d. Other (please detail)
6. Are you aware of how extreme weather or changes in climate could impact your services?
- a. Do you feel that you have adequate information on how your business could be impacted in the future?
7. What steps (if any) are you taking to safeguard your services against severe weather hazards? Some examples include developing an emergency plan, installing hurricane windows, basement drainage, partnering with other local businesses)
- a. If yes, please describe the actions taken.
 - b. If yes, what hazard was the adaptation in response to?
8. Are there any steps you are planning to take?
- a. If yes, do you project any barriers to implement the changes?
9. What resources would be the most beneficial to you?
- a. Information on funding
 - b. A workshop on how to prepare/enhance protection
 - c. Detailed region/sector impacts
 - d. Contact details for state or town officials

- e. Details on how future climate changes will impact my business
- f. A network of other small businesses in the area who face similar risks

10. Have you previously engaged your clients in issues relate to climate change or resiliency?

- a. If yes, what was your approach?
- b. If not, has your organization considered conducting outreach?

11. What could the Town do to support your continued success?

12. ***Any other information you would like to provide?***

DRAFT