Town of Spencer

Community Resilience Building Workshop

Summary of Findings

May, 2018

FUSS & O'NEILL

Project No. 20170390.D50

Town of Spencer

Community Resilience Building Workshop

Summary of Findings

Overview

Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, and there is a clear need to involve municipalities, corporations, organizations, and the State in increasing resilience at all levels. Recent storm events affecting the region have highlighted many of the vulnerabilities that towns and cities face. Hurricane Irene and Superstorm Sandy brought intense flooding to many municipalities and threatened (or destroyed) infrastructure across the state. Extreme temperatures at both ends of the spectrum have pushed the limits of communities' preparedness to protect both infrastructure and people. In coastal communities, the impacts of sea level rise are felt daily and further exacerbate the impacts of other extreme events. Current climate modeling indicates that all of these hazards are expected to increase in frequency and scale over the coming decades. The Municipal Vulnerability Preparedness (MVP) program provides support and a prescribed process for cities and towns in Massachusetts to plan proactively for resiliency and implement key climate change adaptation actions.

In 2017, the Town of Spencer was awarded a $16,000 MVP grant to fund the planning stage of this process. The Town partnered with Fuss & O'Neill, a state certified MVP Provider, to complete a comprehensive, baseline climate change and natural hazard vulnerability assessment and develop a list of priority actions for the Town. This process involved the development of an MVP Core Team, which met on February 8, 2018 to determine initial concerns and worked to identify stakeholders within the municipality and set goals for the process. Those stakeholders were then invited to participate in a Community Resilience Building (CRB) workshop on April 6, 2018, engaging in a day-long, tried and tested process developed by The Nature Conservancy. The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experience to foster dialogue about the strengths and vulnerabilities within the Town. Workshop participants interacted at both large and small group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions.

The CRB workshop's 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 Spencer;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

Top Hazards and Vulnerable Areas

During the Community Resilience Building workshop, participants were asked to identify the top four natural hazards of concern for the Town of Spencer. Discussion of the top hazards built on earlier conversations that took place at the MVP Core Team Meeting, as well as ongoing Town conversations that have formed the basis for the Town's Hazard Mitigation Planning. The collective impacts of ice and snow were identified as one of the Town's top hazards. Severe storm events and associated wind were identified as a second hazard. Impacts of unpredictable precipitation, either excess rain or extended drought were identified as a third hazard. Finally, extreme temperatures, including the increase in both extremely hot days (over 90 degrees F) and extremely cold weather, were seen as a fourth major hazard. These four hazards have already had demonstrated impacts on the Town, and as climate change progresses, these hazards are expected to have ever greater consequences for infrastructure and environment, as well as for various societal elements. Specific areas of concern are identified below.

Top Hazards

- Ice and Snow
- Severe storm Events/Wind
- Excessive Precipitation or Drought
- Extreme Temperatures

Areas of Concern

While many impacts are expected to be felt Town-wide, certain elements, locations, or community groups present particular concerns.

Neighborhoods/Communities
Housing Authority properties (Depot Village and Howe Village), seniors

Events
Spencer Fair

Ecosystems
Wetlands off G.H. Wilson Road

Infrastructure
Sugden Dam, Moose Hill Dam, Lac Marie Dam and bridge at North Spencer Road, Muzzy Meadow Dam and Culvert, Turkey Hill Brook Bridge, Browning Pond Road Bridge and Dam, Cranberry Meadow Pond Dam, National Grid substation, Town wells, pump stations and wastewater treatment plant, private wells

Facilities
Police facility, salt shed, Emergency Operations Center, brownfield sites

Current Concerns and Challenges Presented by Hazards

Major storm events have been a recurring threat to Spencer throughout its history. In recent memory, the Town experienced extensive power outages from downed trees during the October snowstorm that hit in 2011. Road blockages during that event cut off fire service from over three-fourths of the Town until debris could be cleared away. Spencer is a hilly town, with elevations ranging from 300 feet to 1100 feet. This means that weather conditions can vary greatly from one part of town to another; during the same storm, higher areas might receive snow while lower areas experience ice and rainfall. These varied conditions exacerbate the difficulty in managing road conditions and maintaining safe access.

Flooding is also a major challenge in Spencer, and the threat from flooding has been growing with the increasing frequency of major storm events that deliver large amounts of precipitation over a short time period. Workshop participants noted that storms which were previously occurring once every 50 years have now occurred at rates of up to three such storms in eight months. During the workshop, a representative of the Central MA Regional Planning Commission pointed out that Spencer also has a dense network of small streams which increase flood potential. Moreover, new research suggests that Federal Emergency Management Agency (FEMA) Flood Zone mapping, long the standard for estimating flood risk, is increasingly inadequate. The 100 year flood line is no longer believed to be particularly useful, given the changes in precipitation patterns that have occurred already due to climate change, and even the 500 year flood line is questionable. The overall theme is that hazard events in Spencer are becoming less predictable, with sporadic but severe impacts.

There were two dam failures in Spencer in the 1930's, and the Town has 24 recognized dams, including four high-hazard dams. There is concern that climate change could exacerbate flooding to such an extent over the coming decades that dams might be adversely affected. Similarly, more intense storms delivering higher volumes of precipitation in a single event are expected to put significant pressure on dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation.

While excess water is an obvious problem in Spencer, too little water is equally concerning. Spencer has concerns about water supply both for drinking water and firefighting. The extended drought during summer 2016 emphasized the need to increase the public water supply to ensure adequate access during longer droughts. While there were no major impacts recorded during the 2016 drought, a number of private wells did go dry, and the Town has implemented water restrictions in the past to protect the supply from the two Town wellfields.

Spencer also experiences approximately fifteen wildfires per year. Access to water for rural firefighting is dependent in large part on private wells, which, as noted above, can be prone to drying up during periods of drought. Simultaneously, an increase in severe storms and an influx of new pests and diseases, both of which are linked to climate change, are resulting in a higher volume of dead wood in forest systems. Dead wood translates to additional fuel, thereby increasing the risk of wildfire at the same time that water supply for firefighting is becoming a concern. Further underscoring the increasing unpredictability of risks, fire and emergency personnel noted that conditions required them to man Town fire towers in February 2018, not a typical time for high fire risk.

Specific Categories of Concerns and Challenges

Infrastructural

Culverts and Bridges
Culverts and bridges are recognized as a potential concern town-wide. Workshop participants noted, in particular, that the bridge at North Spencer Road, the Browning Pond Road Bridge, the Turkey Hill Brook Bridge, and the Muzzy Meadow culvert were known structures of concern. No detailed inventory has cataloged the size and condition of culverts and bridges town-wide. Regardless of condition, culvert and bridge structures were designed to accommodate historic patterns of precipitation and runoff, which are rapidly transforming as a result of climate change. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding.

Drinking Water Supply
The Town has two wellfields which produce approximately 3 million gallons of water per day. At this time, this is plenty of capacity for the town, but Town officials expressed some concern over the need to increase water supply resiliency to ensure adequate supply during longer droughts, which are expected to increase as a result of climate change. Spencer currently has no formal drought management plan. Water restrictions have been implemented in the past, and use restrictions are expected to become a more frequently used tool in the future. The wells are also in low-lying areas, adding additional vulnerability during storms and flood events.

Facilities
The Town's highway department is in a flood zone, which poses a threat to vehicles and equipment, as well as threatening the ability for the department to respond during hazard events. The highway department is also in an aquifer protection zone, and the Town does not have a salt shed that can safely contain sufficient amounts of deicing materials to handle back to back storms.

Wastewater
The Town's wastewater infrastructure is approximately 100 years old, and the wastewater treatment plant is also in a flood zone. The Town has suspected infiltration and inflow problems in its sewer system, which need to be assessed and corrected in order to prevent sewage overflows during periods of heavy precipitation.

Environmental

Dams
Both man-made dams and beaver dams were discussed as a topic of concern. There are 24 dams recognized by the state, four of which are categorized as high-hazard dams. Town-owned dams are regulated under State dam safety regulations, and most are known quantities. However, less information exists about many of the small dams in Town, particularly private dams. In some cases, it is not even known which dams still exist, let alone their condition or risk potential. Several man-made dams have already been identified as sources of concern, including Browning Pond Dam, Muzzy Meadow Dam, Sugden Dam, and Lac Marie Dam. Whereas the town generally has some record of and control over man-made stream crossings or impoundments, beaver activity is often known only anecdotally, if at all, and can cause unpredictable problems during heavy precipitation, when flooding occurs in unexpected locations. In order to protect fisheries, facilitate passage, and prevent flooding, a study is needed to assess all dams in the Town (public, private, and beaver dams) to establish conditions and risk factors and create a list of priority dams for removal or repair.

Open Space
Open space provides ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Open space is also critical in floodplains for providing a buffer and increased flood storage, near public water supplies to maintain high water quality and promote recharge, and to maintain overall habitat connectivity that will be vital to allowing ecosystems and individual species to adapt to a changing climate. Spencer does not have a current Open Space Plan.

Water Supply Protection
The town has approximately six brownfield sites which are known to have oil or hazardous waste contamination. These sites are both Town-owned and private, and there is concern about potential leaching of hazardous materials during heavy precipitation or flood events. Remediation is needed, but a technical study was identified as a first step in creating a priority list to address these areas.

Societal

Spencer Fair
The Spencer Fair is an event that takes place one weekend per year in late summer and brings together approximately 10,000 people and numerous livestock onto the fairgrounds site on the western side of Spencer. The fairgrounds are in a low-lying area, and could be vulnerable to flooding, but the primary concern is with emergency response and or evacuation in the event of a major storm.

Vulnerable Populations
Workshop participants acknowledged the challenges of identifying and reaching vulnerable individuals, especially those who may no longer have a land-line telephone, or who may not self-identify as vulnerable. Certain populations, especially seniors, are known to be at higher risk during hazard events and may require support beyond emergency notifications. Workshop participants expressed concerns about seniors' ability to obtain food and medical supplies during hazard events, as well as the challenges involved in getting seniors to leave their homes (and sometimes their pets) in order to seek shelter elsewhere. Better understanding what these needs are and how the Town can best prepare to proactively support its entire population are areas that require more exploration.

Vulnerability of Senior Housing Complexes
In addition to senior residents living on their own in single family homes, Spencer has two senior housing facilities that are operated by the Spencer Housing Authority: Howe Village and Depot Village, which collectively house about 250 residents. Both facilities are vulnerable to power outages in the case of a storm. Outages would result in loss of electric heating systems, exacerbating risk to the resident population, particularly during winter storms. Loss of cooling capabilities during periods of extreme heat could also pose a serious concern for the population.

Pests and Disease Control
Climate change is affecting pests and disease vectors both through changing precipitation conditions and changing temperature conditions. Warmer, wetter conditions lead to increased mosquito populations, while the absence of sufficient periods of cold means that pest populations that would historically have been killed off or reduced are able to survive the winter and emerge in greater numbers the following season. Further, as the Massachusetts climate begins to look more like the climate of the mid-Atlantic and southern states, we are seeing new types of diseases show up in existing pests (e.g. mosquitoes carrying West Nile Virus or Zika and ticks carrying Rocky Mountain Spotted Fever). These changes present a major public and animal health challenge in terms of education, prevention, and treatment.

Stress on Emergency Services

Spencer's Fire and Police departments bear much of the burden of responding to the increased human threats that result from climate-induced hazards. An ever larger percentage of the departments' time and resources are being devoted to handling things like traffic accidents and injuries that result from ice or other dangerous conditions and activities to protect property and maintain traffic flows during storm events. These departments are also tasked with the provision of shelter services in times of need.

Current Strengths and Assets

While the Town recognized a number of vulnerabilities, workshop participants identified key strengths as well. Spencer is updating its Hazard Mitigation Plan and Open Space and Recreation Plan; both of these efforts will provide opportunities to build on the priorities established during the MVP process. The Town has been proactive in establishing memorandums of understanding and mutual aid agreements that will

support resiliency during hazards. Spencer also benefits from a partnership with National Grid, which has taken key steps to make their electrical infrastructure more robust and resilient.

- The Town **library serves as a point of distribution for information** and can be used for outreach and education about climate change impacts.
- Spencer has **ample water supply** (under normal, non-drought conditions) from two wellfields that produce approximately 3 million gallons per day.
- The Town is making **infrastructure improvements**, with $19 million being invested into roads and drainage improvements and 30 planned culvert replacements.
- The Town Middle School is available as an **existing emergency shelter** and can provide important amenities, including a first floor cafeteria, showers, pet-friendly accommodations, and the ability to segregate shelter residents from students if necessary.
- The Town receives **daily drought index and fire risk updates** from the MA Department of Conservation and Recreation.
- Individual **citizen preparedness for hazards** is on the rise in Spencer. For example, there has been an increase in the number of generator permits being requested for residential back-up power.
- The Council on Aging has implemented **grab-n-go kits for seniors** that are part of the Council's program, and has educated participants on hazard readiness.
- Most **private wells are drought-resistant** since many are artesian wells and would not be expected to run dry.
- The Health department has access to a **satellite phone and portable radio station** with a three to five mile radius for use in emergencies.
- The Health department maintains a **stocked supply room and response trailer**.
- Spencer is part of a **72 community mutual aid agreement**.
- The Town has a **food procurement agreement/memo of understanding** with the local Price Chopper store which enables food to be distributed in advance of payment if necessary.
- The Town has a **transportation agreement** to provide busses, and has access to transportation resources from the Wooster Regional Transit Authority, although these agreements are subject to availability and resources may be unavailable in the case of a regional hazard event.
- The Town is currently engaged in **hazard mitigation planning efforts** in partnership with the Central MA Regional Planning Commission to update its 2013 Hazard Mitigation Plan. This process will identify actions the Town can take to reduce hazard impacts and is a prerequisite for FEMA funding.

- Additional **open space and recreation planning** will begin next year, and can now incorporate the priorities identified during the MVP planning process.

- The Town benefits from the efforts of **National Grid** which has invested time and money into clearing hazard trees and improving the robustness of the electrical system through grid modernization. National Grid is also proactive about activating mutual aid agreements with other regions up to three days in advance of expected storms.

Top Recommendations to Improve Resilience in Spencer

Participants at the CRB workshop identified a number of recommendations to address vulnerabilities and increase resiliency in three main topic areas: infrastructure, environment, and society. Management of water, primarily dealing with excesses of water due to flooding, was a primary concern that emerged in both the small and large group discussions, as was maintaining sufficient, safe water supply during drought or other hazards. A second theme centered around providing services to the Town's residents during hazard events, with particular attention to vulnerable populations.

Highest Priority

- **Conduct field inventory of culverts, and bridges** to rank and prioritize projects for increased flooding resiliency and storm-hardening, followed by design and implementation of priority re-sizing or replacement projects. Green infrastructure, Low-Impact Design, and other nature-based solutions will be integrated with hard-infrastructure improvements to establish approaches that will be robust in the face of natural hazards and climate-change scenarios. Known problem areas should be areas of focus, including: Sugden Dam, Moose Hill Dam, Lac Marie Dam and bridge at North Spencer Road, Muzzy Meadow Dam and Culvert, Turkey Hill Brook Bridge, Browning Pond Road Bridge and Dam, and Cranberry Meadow Pond Dam.

- **Complete a Town-wide dam assessment** of all public, private, and beaver dams, focusing on exploration of dam removal priorities to improve species' resiliency by increasing fish passage and habitat and also reduce the risk of flooding from dam failures during intense storm events. Technical study should include town-wide survey to update information on which small dams still exist, establish ownership and an understanding of condition, determine risks from each dam, and prioritize projects.

- **Perform a risk assessment of the wastewater treatment plant and pump stations** and establish priority actions for reducing potential flooding impacts, including consideration of nature-based solutions or green infrastructure approaches. Establish emergency back-up plans for the plant and pump stations.

- **Conduct sewer infiltration and inflow study** to determine likely problem areas and establish a priority list of next steps for reducing flooding impacts related to infiltration and inflow.

- **Assess green infrastructure opportunities** to develop a list of specific priorities, assess feasibility and cost, rank priority projects in terms of climate resilience potential, and develop concept designs for key projects. Review Town regulations and update as necessary to support green infrastructure and low-impact development.

- **Construct a salt shed and implement best management practices** to allow for adequate protected storage of deicing materials. This will enable the highway department to better prepare for storm events and keep roadways open and safe, particularly when storms occur back to back or at unpredictable times (such as the October snowstorm of 2011). The salt shed will also protect deicing materials from precipitation, which will in turn prevent discharge into the aquifer protection zone and is in keeping with best management practices and the minimum control measures required by the Town's MS4 Permit.

- **Establish an Emergency Operations Center** and enhance existing police facilities to create a staging center outside of Town flood zones and provide severe weather protection for the Town's emergency vehicles and other vital equipment.

- **Conduct studies to prioritize remediation actions on brownfield sites** to eliminate the risk to public water supplies due to leaching and contamination from the several 21E sites in Town.

- **Identify open space priorities** focused on areas that will create flood resiliency through increasing storage capacity in floodplains and/or infiltration capacity in uplands. Incorporate priorities on both public and private lands and update Open Space and Recreation Plan.

- **Develop transportation planning for vulnerable populations during hazard events** to ensure that vulnerable groups, notably seniors, will be able to get to shelters, obtain food and medications, or receive emergency services. Focus should be on identifying vulnerable populations and providing aid during all types of climate-induced risks, such as extreme temperatures, increasingly intense storms which may make travel difficult, or flooding and storm events that may leave residents unprepared, stranded, or cut off from supplies.

- **Conduct robust education and outreach to build awareness of town resources** and make Town residents aware of the many planning efforts, agreements, shelters, etc. which are focused on making the Town more resilient to climate change impacts. Ensure that all residents know how to access these resources when they are needed.

- **Expand the successful grab-n-go kit program** to include all senior residents or otherwise vulnerable individuals. Explore ways of making sure that information in the kit, particularly medication lists and health information, is kept up to date.

- **Pursue funding to create a Spencer App** to facilitate information delivery and emergency communications, and develop a strategy for who will maintain the app and update information during hazard events.

Moderate Priority

- **Pursue opportunities to fund open space acquisition** that will mitigate the effects of increased storm events; explore opportunities like Community Preservation Act funding.

- **Conduct education and outreach related to open space preservation** to build knowledge about the positive effects of open space on climate resiliency, the basis for prioritizing certain open space parcels, and why this topic is relevant to a diversity of audiences in Town.

- **Educate owners of private septic systems** about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment from systems that become overwhelmed during periods of heavy precipitation.

- **Develop an emergency response and evacuation plan for the Spencer Fair** that addresses how to protect both people and animals, including contingencies for housing up to 10,000 people and additional livestock and wild animal populations, providing food and water, and handling wastes.

Lower Priority

- **Study the possibility of expanding the public water supply geographically** to alleviate concerns with private wells drying out and improve rural firefighting infrastructure. Consider Shaw Pond, in neighboring Paxton, as a potential surface water source.

- **Establish a formal drought plan** to detail appropriate actions to be taken during times of extended drought.

- **Increase services of emergency shelters** by purchasing emergency generators and enhancing operations at Maple Street School and Town Hall.

- **Pursue public facilities upgrades that would increase resiliency**, including relocating the Highway Department to a location not prone to flooding, and develop plans for cooling stations.

CRB Workshop Participants

All workshop invitees are listed below; attendees are indicated with an asterisk.

Name	Position/Organization
Steven Tyler*	Superintendent/ Highway Dept., Spencer, MA
Cheryl Donahue*	Library Director/ Richard Sugden Library, Spencer, MA
David Darrin*	Chief of Police/ Spencer, MA
Eben Butler	Member of the Board of Water Commissioners/ Spencer, MA
Greg Karpowicz	Chief Water Operator/ Water Dept., Spencer, MA
James LaPlante*	Superintendent/ Sewer Dept., Spencer, MA
Laura Torti	Town Clerk/ Spencer, MA
Linda LeBlanc	Principal Assessor/ Spencer, MA
Margaret Washburn	Wetland-Soil Specialist/ Conservation Commission, Spencer, MA
Mary Baker-Wood*	Member of Historical Commission/ Spencer, MA
Pam Woodbury*	Director/ Council on Aging and Senior Center
Paul Dell'Aquila*	Town Planner/ Spencer, MA
Robert Parsons*	Fire Chief/Emergency Management Director/ Spencer, MA
Susan L. Lacaire	Treasurer Collector/ Spencer, MA
Tim Gagnon	Veteran Services Officer/ Veterans Agent, Spencer, MA
William Klansek	Zoning Enforcement Officer, Building Inspector)
William Ross	Interim Town Administrator/ Human Resources, Spencer, MA
Gary Suter	Business Administrator/ Spencer-East Brookfield Regional Schools
Lisa Daoust *	Health Agent/ Broad of Health, Spencer, MA
Charlene Kaiser*	Housing Authority, Spencer, MA
Michael LeTendre*	Housing Authority, Spencer, MA
Sandy Show*	Director/Common Ground Land Trust
Susan Horner*	Senior Property Manager/ MHPI
Kory Bryant	East Brookfield and Spencer Railroad
Bob Knight*	Environmental Compliance Manager/Spencer Agricultural Assoc.
James Tessier*	Senior Environmental Engineer/ FLEXcon
Darwin Irish*	Director Risk Management/ FLEXcon
Mary McLaughlin	Science Dept./ David Prouty High School
William Salomaa	Program Manager/ State, MA
Andrew Loew*	Principal Planner/Central MA Regional Planning Commission
Brother Adam Zielonka*	St Joseph's Abbey
Father Vincent Rogers*	St Joseph's Abbey
Kevin F. Shaughnessy*	Community and Customer Manager/National Grid
G Bell	East Brookfield and Spencer Railroad
Chris Gleason*	High School Envirothon Team Member
Alicia Triggs*	High School Envirothon Team Member
Nicole Ouellette*	High School Envirothon Team Member
Brian Sarmiento*	High School Envirothon Team Member
Sean Sarmiento*	High School Envirothon Team Member
Peter Sabosik*	High School Envirothon Team Member
Mary McLaughlin*	High School Envirothon Team Coach

* indicates attendees

Citation

Fuss & O'Neill (2018). Community Resilience Building Workshop Summary of Findings. Town of Spencer, Fuss & O'Neill,Inc. Spencer, Massachusetts.

CRB Workshop Project Team: Organization, Name, Role

Name	Organization	Role
Steven Tyler	DPW Superintendent	Project Coordinator/Core Team Member
Greg Karpowicz	Chief Operator, Water Department	Core Team Member
Jim LaPlante	Sewer Superintendent	Core Team Member
Dave Darrin	Chief of Police	Core Team Member
Bob Parsons	Fire Chief	Core Team Member
Cheryl Donahue	Library Director	Core Team Member
Laura Torti	Town Clerk	Core Team Member
Paul Dell'Aquila	Town Planner	Core Team Member
Andrew Loew	Central MA Regional Planning Commission	Core Team Member
Pam Woodbury	Director, Council on Aging	Core Team Member
Lisa Daoust	Health Agent	Core Team Member
Mary Monahan	Fuss & O'Neill	MVP Lead Facilitator
Julianne Busa	Fuss & O'Neill	Facilitator/Scribe
Diane Hayes	Fuss & O'Neill	Facilitator

Acknowledgements

Many thanks to the MVP Core Team members, CRB workshop participants, and to Steven Tyler who acted as the local Project Coordinator. Thanks to the Town of Spencer and the Council on Aging for providing a meeting space for the Core Team Meeting and CRB Workshop and to Pam Woodbury who coordinated the CRB Workshop. Special thanks to the Spencer High School Envirothon Team whose members served as scribes and contributed their ideas to the workshop.

Funding for the CRB Workshop was provided through a Massachusetts MVP grant.

Appendix A

CRB Workshop Base Map

SPENCER, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

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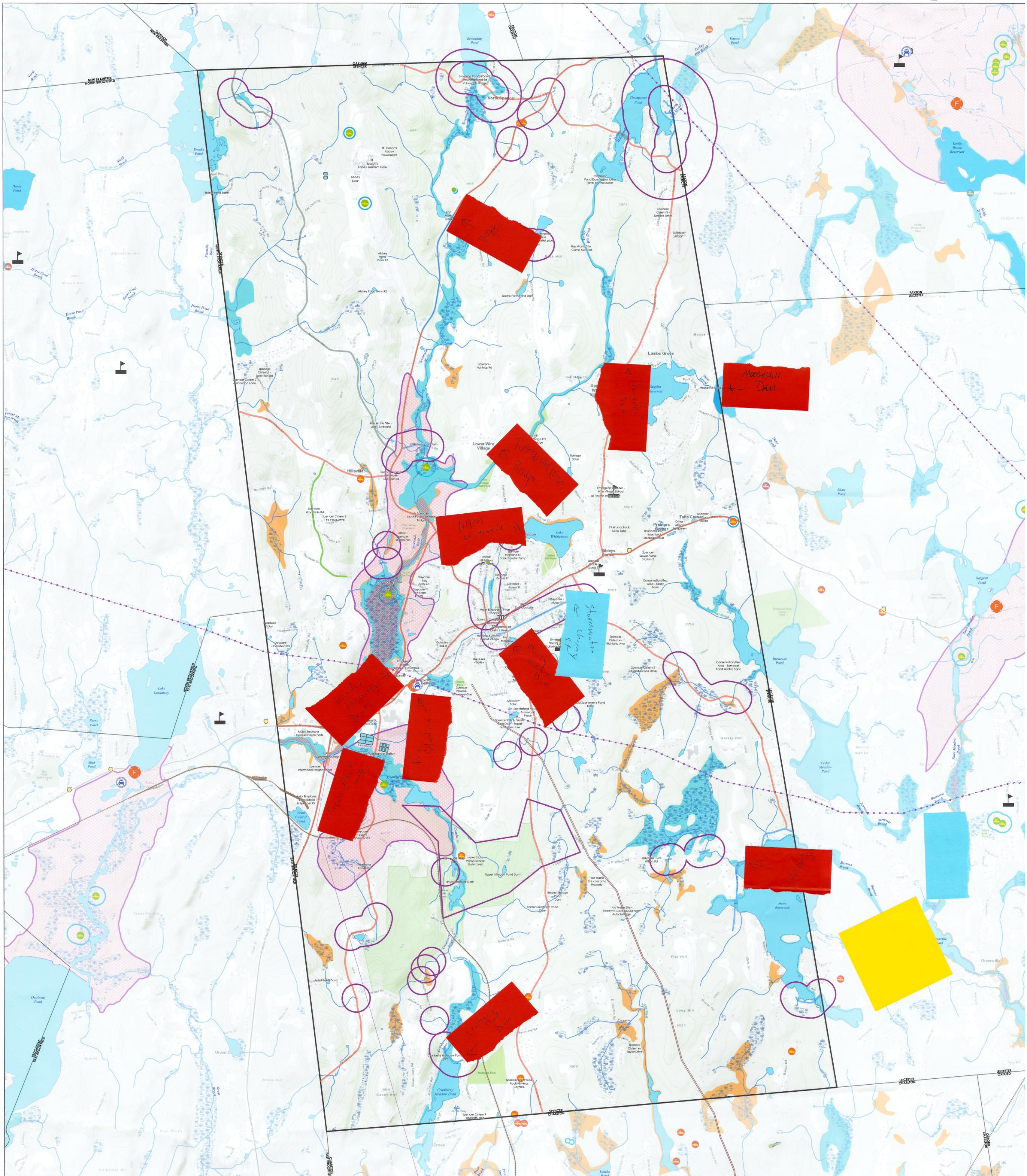
Appendix B

CRB Workshop Outputs:
Participatory Mapping Exercise & Risk Matrices



Hazard Mitigation Plan Data

- Known Flooding Areas
- Evacuation Route
- Past Downed Trees
- Snow Drifts
- Other Identified Hazard Areas
- Town Hall
- Police Station
- Fire Station
- School
- Rest Home
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water
- Underground Storage Tanks
- Railroads - Active Service
- Pipeline
- Powerline
- Stream
- Manmade Shoreline
- Pond, Lake, Ocean
- Reservoir
- Wetland
- Wellhead Protection Zone I
- Wellhead Protection Zone II

Flood Zone Designations

- 1% Annual Chance of Flooding
- Regulatory Floodway
- 0.2% Annual Chance of Flooding

0 0.5 1
Miles

Data sources:
CMRPC - Hazard Mitigation Plan Data
MassGIS - Infrastructure, Hydrology, and Administrative Data
ESRI - World Topographic Map - Base Map

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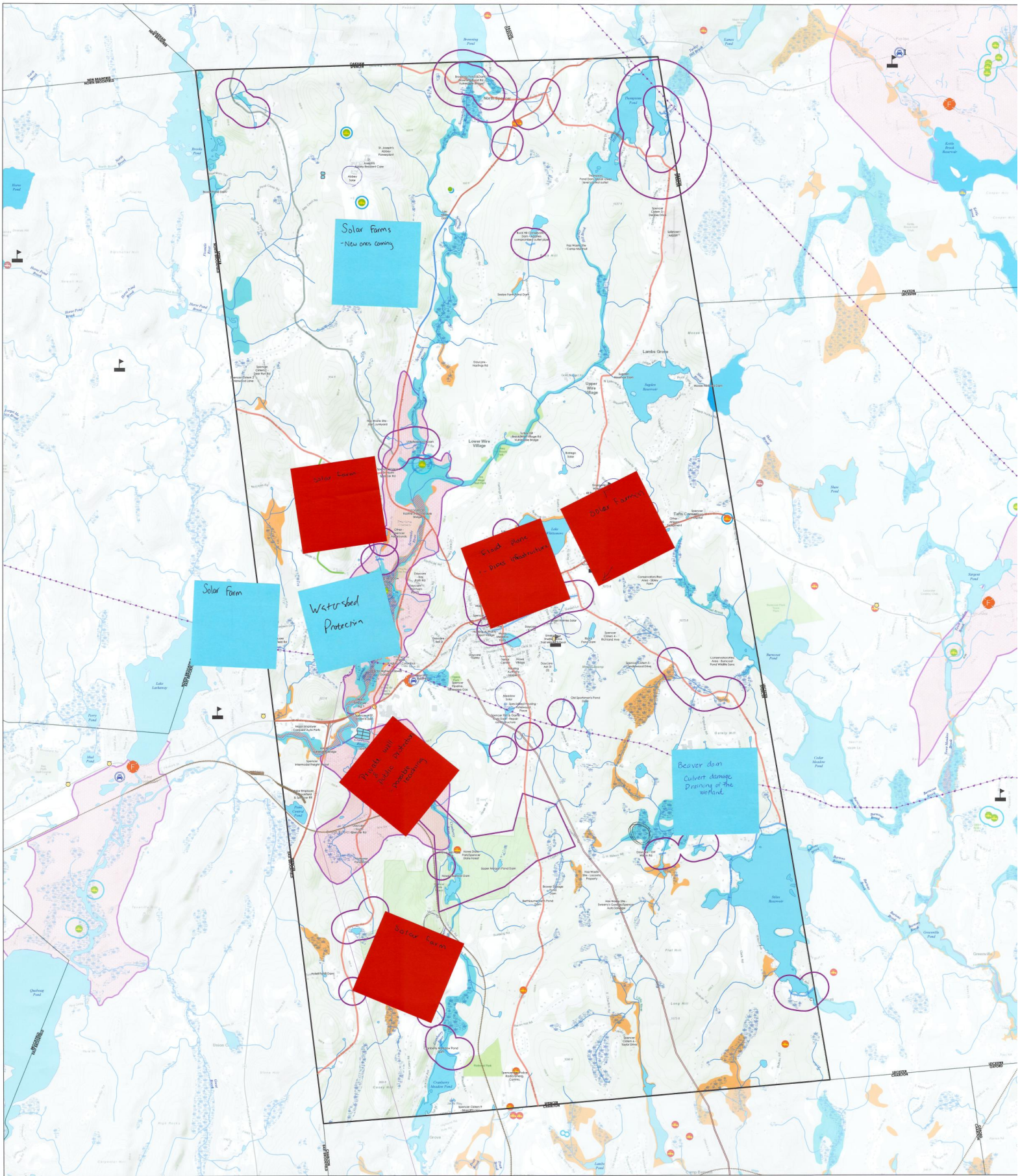

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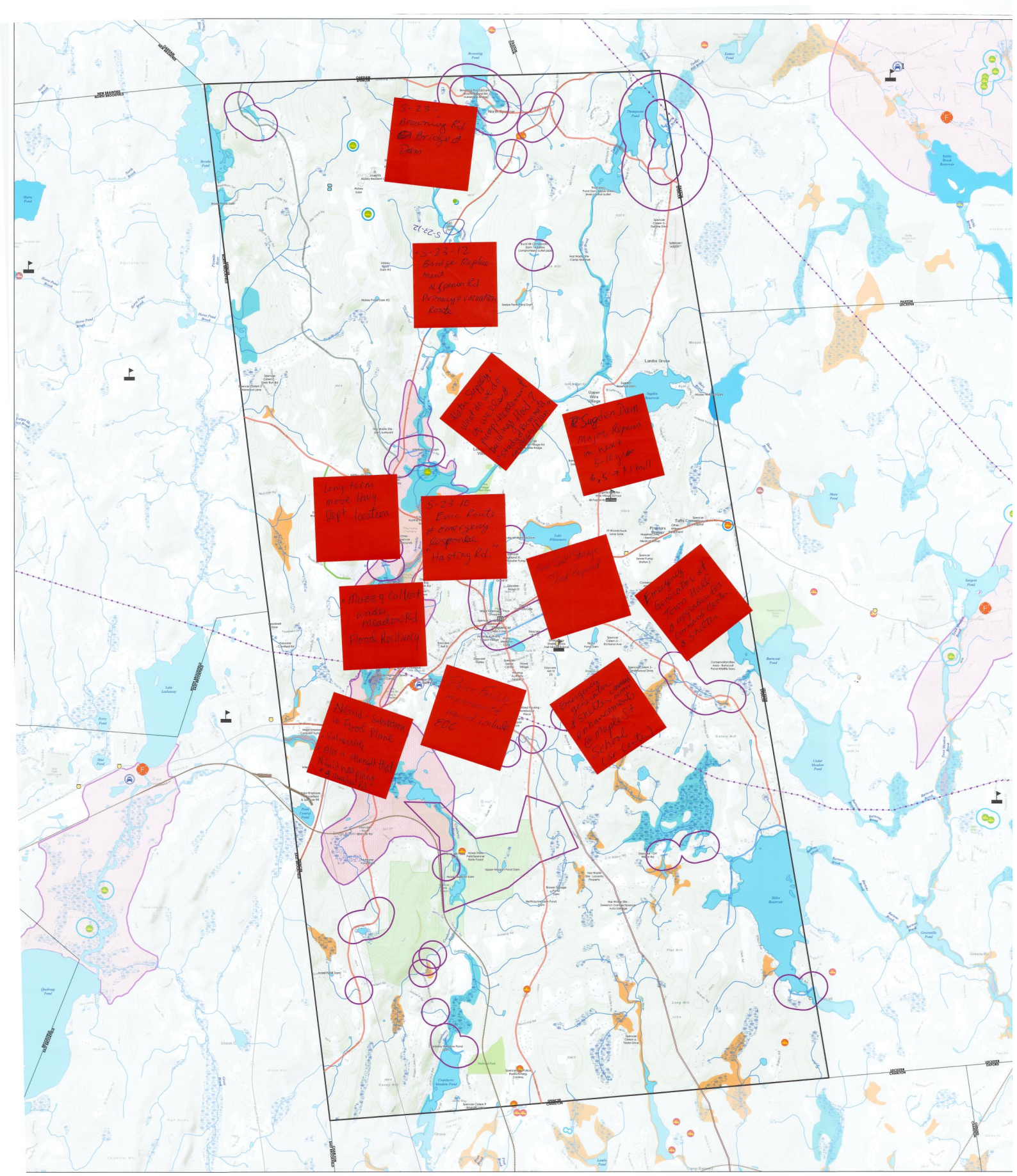

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Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Snow + Ice	Severe Storm	Temp. / drought	Precipitation	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Police Edition + EOC	9 West Main St.	town	V	Any emergency situation	Y	N/A	N/A	H	ongoing
Salt Shed *(New)	7 Meadow Rd.	town	V	Storms, Snow, Ice	N/A	N/A	N/A	H	on going
Address High priority Dams - Browning Pond, Muzzy Pond, Sugden Dam * Bridge of Dam @ Browning Pond		Town & Unknown	V		Y	N/A	Y	H	ongoing
Emergency generators, Shelters ~~and facilities~~ etc. @ Town Hall & Maple St School (& possible backup EOC)	68 Maple St 157 main St	"	S	Y	Y	Y	Y		
Emergency / Back plan (study?) for water & wastewater pump stations or backup water supply (Shaw Pond)	Water Dept Sewer Dept	"	V						
Societal									
Environmental									

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

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

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flooding / Drought	Severe Storms	Ice + Snow	Severe Temperatures	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Roads + Bridges	Turkey Hill Brk Bridge, Lac Marre Dam, Stiles Causeway	Town/State	V		Implement $19 million plan; Seek Grants, Work with MPO		Pavement Condition Study	H	O
Sewer System (Plant, I/I)	Sewer Plant	Town	V	I/I Study; Sleeving Program				H	O
Water System	Water Plant; Coverage Area	Town	S	~~Public~~ Private Wells; Study Expansion of Water System; Drought Plan	Rural Firefighting Draw Points; Study and Implement Flood Protection for Water Treatment and Pump Stations			L	L
Storm Water	Cherry St.; Townwide	Town	V			Study and Update Bylaws		M	L/O
Public Facilities	Fire Dept., Highway Dept., Town Hall	Town	V		Relocate Highway Dept		Develop Plan for Cooling Stations	Highway – H; Overall – L	L/O
Utilities	Town wide	Private	V/S		National Grid Resilience Pg.			H	O
~~Societal~~									
Dams	Whittemore Dam, Moose Hill, Sawyer, Mossy Meadow	Town/Private/State	V/S	Maintenance and Removal Options	Downstream Vulnerability			L	O
Emergency Communication System	Townwide	Town	V/S		Upgrade and Build Up System			M	O
Environmental									

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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Wind/ tornado	Temperature	drought	Floods	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Societal									
Spencer Fair Event	Spencer fair	AGR	V	Do a study and plan for evacuation	Provide a water source	Provide a water source	Relocate	H	S
Senior Housing	Howe Village	State	V	no power; add generators	All units have A/C	water restriction	communication and relocate, sump-pump	H	O
Transportation	All seniors	Town	V	Difficult transporting to shelters.	N/A	N/A	SEMA, families, staff, emergency services	H	S
Board of Health	town-wide	Town	S	Communication; Food, supplies and preparedness	Provide supplies needed	Communication to public	Communication to public; educating the public	H	O
Environmental									

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V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority	Time
								H - M - L	Short Long Ongoing
Infrastructural									
Low areas, Pope street, Muzzy Meadow									
Societal									
Transportation - Elderly	Multiple								
Communication - App									
Identify at risk people									
Education - Preparation									
Environmental									

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

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H - M - L	Time S Long O ngoing
Infrastructural									
Societal									
Environmental									
Dams (Man-made and beaver)	several in town	Town + Private	V	Fisheries	Flooding	Removal	Need for technical Studies	Need to establish Priority lists	Ongoing
Water Supply Protection	21 E. Sites (5 or 6)	Town + Private	V	Leaching during flood events		Remediation	Need for technical Studies	Need to establish Priority lists H	Ongoing
Identify Open Space Priorities	Town-Wide	Town + Private	S	No ~~coherent~~ current plan		Update town open space plan	Need for technical Studies	High	Short Term
Establish Town Funding for Open Space protection And environmental	Town-Wide	Town	S	Mitigate effects of increased storm events		Explore funding options including CPA	Data	Medium	Short Term
Education / Outreach	Town-Wide	Town + private	S	Lack of awareness		Use all available outreach techniques	Programming + materials	Medium	ongoing
Low impact developement	Town-Wide	Town	S	Mitigate environmental hazards + Storm events		Town regulations Bylaw?	Study + Zoning Changes	Medium	Long Term

Appendix C

CRB Workshop Presentation Materials

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Boston Firefighters, January 4, 2018 (Reuters)

Cambridge Reservoir, Lincoln, MA (Boston Globe)

Municipal Vulnerability Protection Program
Community Resilience Building Workshop
Town of Spencer

February 8, 2018

Agenda

1. Introduction to MVP and What It Means to Your Community
2. What is Climate Change?
3. Climate Change in Massachusetts
   - Northeast Climate Center at UMass
   - Climate Change Projections in Your Watershed
4. Climate Change Impacts
5. Hazard Mitigation and Emergency Management Planning in Your Community
6. CRB Workshop
   - Table Teams
   - Maps
   - Risk Matrix
7. Final Discussion

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Spencer MVP Program - $16,000

- Grant Supports Climate Change Vulnerability Assessments and Resiliency planning
  - Comprehensive Approach
    - o Infrastructure
    - o Society
    - o Environment
  - Scope and Process Use the Guidance in the Community Resilience Building Workshop Guide
  - Municipalities That Complete This Process Will Be Designated Municipal Vulnerability Preparedness (MVP) Municipalities

MVP Designation May Lead to Enhanced Standing in Future Funding Opportunities

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MVP Program

- Community Resilience Building
  - Hold Workshop to Engage Stakeholders in the Community
  - Identify Impacts Using Available Data, Including New Climate Projections Developed by the Commonwealth
  - Identify Community Strengths and Vulnerabilities from Data and Community Input
  - Prioritize Actions - Conclude Workshop
  - Prepare and Review Report and Priorities
  - Move Forward
    - o Identify and Monitor Funding Opportunities for Recommendations
    - o Incorporate Plan into Other Local Planning Efforts

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MVP Program

- Project Requirements
  - Communities Must Contract with State-certified MVP Providers
  - Local Match Is a Commitment of Time Estimated at 80 Hours to Assist in the Workshop Planning and Local data collection
  - Project Completion Deadline Is June 23, 2018

Terminology

Climate Change

The Change in Usual Climate Conditions

- Rising Temperature
- Changing Precipitation/ Rainfall Amount and Intensity
- Sea Level Rise

Town of Spencer – Chicopee and Quinebaug River Basin

Rising Temperature

Chicopee Basin Quinebaug Basin	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Average Annual Temperature (°F)	46.16 46.86	2.24 2.17	to	4.48 4.32	3.03 2.98	to	6.40 6.37	3.58 3.57	to	8.97 9.03	4.01 3.92	to	10.98 11.07
Annual Days with Maximum Temperature over 90°F (Days)	3.34 3.28	4.84 4.45	to	15.43 13.91	7.78 7.24	to	28.70 26.64	9.27 9.13	to	49.25 46.88	11.38 10.86	to	69.89 65.64
Annual Days with Minimum Temperature below 0°F (Days)	11.43 10.37	-3.83 -3.17	to	-6.82 -5.85	-4.78 -3.98	to	-8.18 -6.78	-5.36 -4.53	to	-8.67 -7.56	-5.20 -4.26	to	-9.27 -7.76

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Town of Spencer – Chicopee and Quinebaug River Basin

Changing Precipitation

Chicopee Basin Quinebaug Basin	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Total Annual Precipitation (Inches)	46.64 48.56	-0.23 0.03	to	4.66 4.98	1.14 1.19	to	5.98 6.55	1.76 1.96	to	7.03 7.74	1.37 1.74	to	7.67 8.90
Annual Consecutive Dry Days (Days)	15.63 16.11	-0.56 -0.76	to	1.44 1.25	-0.93 -0.88	to	1.97 1.91	-1.12 -1.38	to	1.97 1.92	-0.69 -0.64	to	2.74 2.53

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Climate Change Impacts - Temperature

- Economic
  - Winter Recreation
  - Snow and Ice
- Agricultural
  - Longer Growing Season
- Health
  - Increased Pests
  - Heat Stroke
- Infrastructure
  - Road Buckling
  - More Potholes
  - Power Outages
- Environment
  - Change in Habitat

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Climate Change Impacts - Precipitation

- Economic
  - Dangerous Floods
- Agricultural
  - Excessively Wet Spring
  - Drought
- Health
  - Flood/High Water-related Deaths
  - Emergency Response Delays
- Infrastructure
  - Road Washout
  - Environment
  - Sewer System Overflows
  - Compromised Bridges
- Changes in Habitat

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Hazard Mitigation and Emergency Management Planning in Your Community

Local Leaders

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MVP Program



Climate MVP Communities: Local Impact, Local Action

1. Engage Community
2. Identify CC Impacts and Targets
3. Complete Vulnerability Assessment
4. Prioritize Vulnerability
5. Take Action

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Risk Matrix

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

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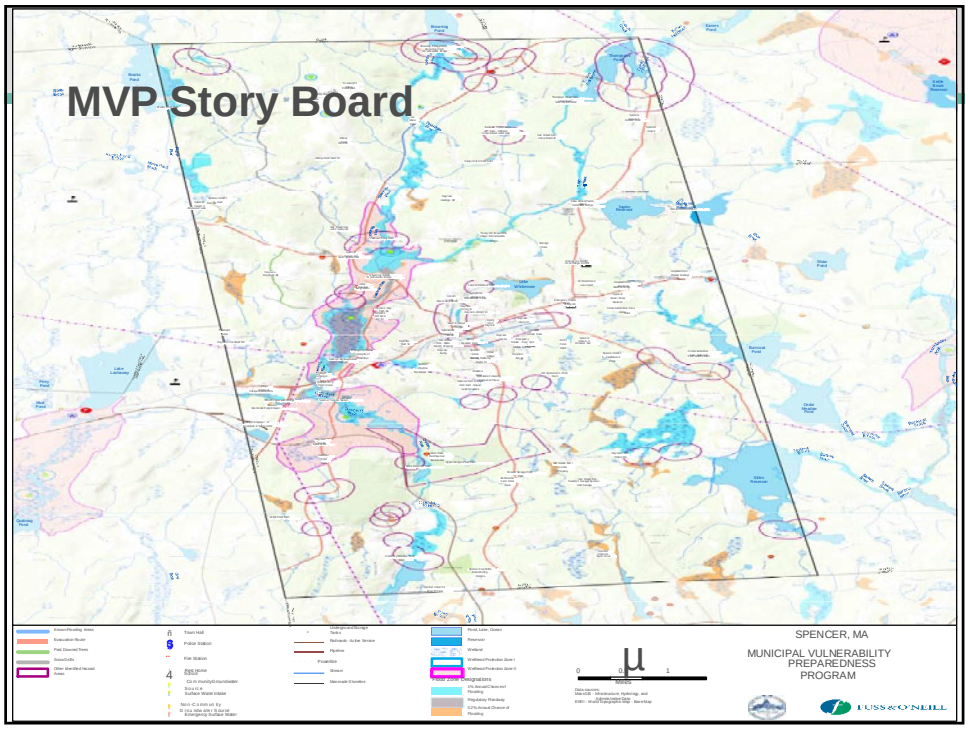

Community Resilience Building Workshop

Next Steps:

CRB Workshop

Who When Where

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Community Resilience Building Workshop

Questions?

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