

# TOWN OF DUDLEY



## Municipal Vulnerability Preparedness Summary of Findings

May 2020

With assistance from



## CMRPC MISSION

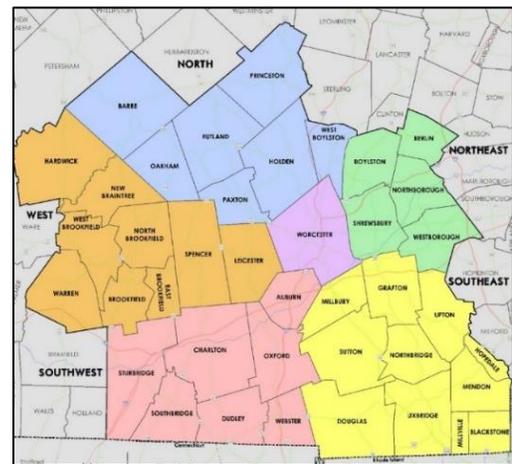
The Central Massachusetts Regional Planning Commission is a regional partnership serving the planning and development interests of 40 member communities in southern Worcester County in Massachusetts. Our primary mission is to improve the quality of life for those who live and work in our region.



We do this by (1) addressing growth and development issues that extend beyond community boundaries; (2) maintaining the region's certification for federal transportation improvement funds; (3) providing technical knowledge and resources to assist local government in addressing specific land use, economic or environmental problems resulting from growth or decline, and (4) building strong working relationships with member communities, state and federal officials, as well as the range of area stakeholders.

## OUR HISTORY AND PROGRESS

Founded by the Massachusetts Legislature in 1963, the Central Massachusetts Regional Planning Commission (CMRPC) provides a variety of services to its constituencies and brings a regional perspective to planning and development. One of 13 regional planning agencies in Massachusetts, CMRPC serves the city of Worcester and 39 surrounding communities in the southern two-thirds of Worcester County. CMRPC's programs include Transportation, Regional Services, Geographic Information Systems (GIS), and Community



### FEDERAL TITLE VI/NONDISCRIMINATION PROTECTIONS

The Central Massachusetts Metropolitan Planning Organization (CMMPO) hereby states its policy to operate its programs, services and activities in full compliance with federal nondiscrimination laws including Title VI of the Civil Rights Act of 1964 (Title VI), the Civil Rights Restoration Act of 1987, and related federal and state statutes and regulations. Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin, including limited English proficiency, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving Federal assistance. Related federal nondiscrimination laws administered by the Federal Highway Administration, the Federal Transit Administration, or both prohibit discrimination on the basis of age, sex, and disability. These protected categories are contemplated within the CMMPO's Title VI Programs consistent with federal and state interpretation and administration. Additionally, the CMMPO provides meaningful access to its programs, services, and activities to individuals with limited English proficiency, in compliance with US Department of Transportation policy and guidance on federal Executive Order 13166.

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## EXECUTIVE ORDER 569 AND THE MASSACHUSETTS MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

In September 2016, Massachusetts Governor Baker signed Executive Order 569, directing multiple state agencies to develop and implement a statewide comprehensive climate adaptation plan with the best climate-change data available. Recognizing that many adaptation solutions are local in nature, a key commitment of Executive Order 569 is to assist local governments in completing their own assessments and resiliency plans. The MVP Grant and Designation Program represents the first step in fulfilling this commitment.

The MVP program provides planning grants to municipalities to complete vulnerability assessments and develop action-oriented resiliency plans. Funding is used by cities and towns to hire an MVP-certified consultant who is trained to provide technical assistance and complete a community's vulnerability assessment and resiliency plan using the Community Resilience Building Framework. Towns and cities are free to choose the consultant of their choice from a list of certified MVP provider. The Town of Dudley invited the Central Massachusetts Regional Planning Commission to lead them in this planning effort.

Communities that complete the MVP planning process become certified "MVP Communities" and are eligible for Action Grant funding and other opportunities through the Commonwealth.



<https://www.mass.gov/news/governor-baker-signs-legislation-directing-24-billion-to-climate-change-adaptation>

## ACKNOWLEDGEMENTS

The Municipal Vulnerability Preparedness (MVP) program and Community Resiliency Workshop was funded by the Executive Office of Energy and Environmental Affairs. This Summary of Findings and CRB Workshop were prepared for the community of Dudley by the Central Massachusetts Regional Planning Commission (CMRPC). Support from the Dudley Board of Selectmen and the town officials was much appreciated, especially for allowing the workshop and listening session to take place in the Selectmen's Meeting Room.

The CMRPC would like to acknowledge the Town of Dudley's Core Team for their time and hard work in participating in this project. These include, but are not limited to:

Jonathan Ruda, Town Administrator, Project lead

Don Johnson, Town Planner, (former)

George Patrinos, Water Superintendent

Vinny Polletta, Highway Superintendent

Michelle Jarvis, Administrative Secretary

Dean Kochanowski, Fire Chief

Bill Scanlan, Acting Town Planner

The following individuals were directly and personally involved in planning and conducting the Dudley Community Resilience Building Workshop:

Peter Peloquin, Associate Planner, CMRPC

Ian McElwee, Principal Planner, CMRPC

Mimi Kaplan, Associate Planner, CMRPC

Andrew Loew, Project Manager, CMRPC

Connor Robichaud, Regional Projects Coordinator, CMRPC

Hillary King, Regional Coordinator, EOEEA

## DUDLEY: A PROFILE

The Town of Dudley, Massachusetts was incorporated in 1732. Dudley is located along state routes MA-197, MA-131 and MA-31, approximately 20 miles south of the City of Worcester. Dudley is a rural bedroom community with some minor industry. Dudley lies within two watersheds that nearly split the Town in half. The western half lies within the Chicopee River Basin, while the eastern half lies within the French River Basin. Dudley is bordered by Southbridge on the west, Webster on the east, the State of Connecticut on the south, and Charlton and Oxford on the north.

Dudley has a population of 11,682 (American Community Survey Dudley Town Report 2018). With having 20.82 square miles of land area, the population density resides around 547.1 people per square mile. Dudley can be designated as a predominately white community, with 91.2% of the population identifying with that group. The median age range for the population is 37.8 with 21.2% of the population below the age of 18 and 13.6% of the population over the age of 65. The median household income for the community is \$67,117, with 6.4% of the population living below the poverty line. Dudley is a demographically stable community, with population growth slowing as buildable land has been on decline following the 1990 surge. According to the Central Massachusetts Regional Planning Commission's (CMRPC) Long Range Transportation Plan, Mobility 2040, the Town of Dudley is expected to experience low population growth of the next 25 years.

The Town of Dudley has an active population in its municipal buildings. Dudley is home to the Dudley Municipal Complex, which is home to the Police Department, Senior Center, Veterans Center and Municipal Offices. The Library -- separate from the municipal building-- and senior center are the social epicenters of the town with daily programs for all ages between the two buildings. The Fire Department built a state-of-the-art fire station that was completed in 2019. The Department of Public Works is home to the Highway, Water and Sewer departments and shares parts of the property with the Animal Shelter and Recycling Center. Dudley belongs to the Dudley-Charlton Regional School District and is also home to the Mason Road School, Dudley Elementary School, Dudley middle School and Shepherd Hill Regional High School.

## WORKSHOP SUMMARY

The Town of Dudley's Municipal Vulnerability Preparedness (MVP) workshop was held on Friday, January 10, 2020 at the Dudley Town Hall. The Town of Dudley contracted with the Central Massachusetts Regional Planning Commission (CMRPC) to serve as the MVP provider, including completing the Community Resiliency Building (CRB) workshop. Through the Community Resilience Building (CRB) process, stakeholders actively engaged in an ongoing discussion to



**Town of Dudley**  
Municipal Vulnerability Preparedness  
Friday, January 10, 2020  
8:30am – 4:30pm; Registration at 8:00 am  
Dudley Town Hall  
71 West Main Street, Dudley, MA

**Workshop Objective**

- Define extreme weather and climate related hazards;
- Identify current and future vulnerabilities and strengths;
- Develop and prioritize actions; and
- Identify opportunities for the Town to advance actions and reduce risks to build resilience

**Workshop Agenda**

- 8:00am – 8:30am Registration, Networking & Coffee
- 8:30am – 10am:
  - Welcome and Overview
    - Fire Chief Dean Kochanowski
  - MVP Program Overview
    - Hillary King, Central Region MVP Coordinator, EDR&A
  - Overview Presentation
    - Peter Palouquin, CMRPC
  - Climate Change Projections and Impacts
    - Mimi Kaplan, CMRPC
  - Profile of Natural Hazards
    - Andrew Loney, CMRPC
- 10am – 12pm
  - Breakfast Groups – Identify Hazards, Local Features, Strengths & Vulnerabilities
- 12pm – 12pm Lunch Break
- 1pm – 4:30pm:
  - Afternoon Overview – Peter Palouquin, CMRPC
  - Breakout Groups – Identify & Prioritize Actions
  - Table Reports and priority vote
  - Closing Remarks and Wrap up

Thank you for participating in Dudley's Community Resilience Building Workshop!

determine the top hazards related to climate change that currently impact or have the potential to impact Dudley. A small group of Town officials and convened on August 14, 2019 to form the 'Core Team' which, together with CMRPC staff, organized and planned the CRB Workshop over the course of five monthly meetings.



## Workshop Invitees and Participants

Name	Affiliation	Attended
Margaret Bussiere	Council on Aging	N
Denis Driscoll	Cultural Council	N
Mark Marzeotti	EDC	N
Dickie Androlewicz	ConCom	N
Daniel Edmiston	Planning Board	N
Jennifer Cournoyer	Board of Health	Y
Steven Lamarche	School Superintendent	Y
Robert LaVigne	Nichols College – Director of Operations	Y
Elizabeth Prince	Tri Valley	Y
Charles Pappas	Park & Shop	N
Catherine Benjamin	Gentex	Y
Kevin Shaughnessy	National Grid	Y
Vinny Polletta	Storm Water Committee/Superintendent Highway Dept.	Y
Victor Kallgren	Agricultural Committee	N
Paul Wieloch	Dudley Conservation Land Trust	Y
Mark Ruggieri	Webco Chemical Inc.	Y
Ryan Simpson	Shields Packaging	N
Douglas Willarston	Webster Representative	N
Jennifer Callahan	Oxford Representative	N
Graham Maxfield	Charlton Representative	N
Ron San Angelo	Southbridge Representative	N
Ken Beausoleil	Thompson CT Representative	N
Jarrold Hutcheson	Providence/Worcester RR	N
Westville Lake	Army Corps. Engineering	N
Kenneth Butkiewicz	Rail Trail	N
Edward Bazinet	French River	N
William Salomaa	Office of Dam Safety (DCR)	N
Jack Clarke	Mass Audubon	N
Barry Lorion	Mass DOT – Division 3	N
Liz Hamilton	Boys and Girls Club	N
Lucille Allard	Housing Authority	N
Stephen Rogerson	Veterans Representative	Y
Steven Sullivan	Board of Selectman	N
Alexandra Burpee	Records and Burpee Animal Farm	Y
Drusilla Carter	Library	Y
Jonathan Androlewicz	Rampco Construction	Y
Pete Durant	State Representative	N
Jon Ruda	Dudley TA	Y

George Patrinos	Dudley Water Department	Y
Stanley Golenski	Dudley Highway Department	Y
Bill Scanlan	Acting Planner	Y
Don Johnson	Town Planner	N
Michelle Jervis	Administrative Secretary	Y
Steven Wojnar	Dudley Police Chief	Y
Dean Kochanowski	Dudley Fire Chief	Y
Udo Plocher	Henke Sass Wolf	N
Hillary King	EEA	N
Ted Zajkowski	Building Department Clerk	Y
Christopher Levesque	Webco Chemical	Y
Peter Fox	Dudley Conservation Land Trust	Y
Tim Galvin	Dudley Water/Sewer Department	Y
Paul Konieczny	Dudley Fire Department	Y
David Harrigan	Dudley Conservation Land Trust	Y
Scott Zajkowski	Dudley Water/Sewer Department	Y

### Core Team and Project Team

Name	Affiliation	Role
Jonathan Ruda	Town Administrator	Project Manager, Facilitator
Michelle Jervis	Admin. Secretary	Core Team, Facilitator
George Patrinos	Water Department	Core Team, Facilitator
Bill Scanlan	Acting Town Planner	Core Team, Facilitator
Don Johnson	Town Planner-Former	Core Team, Facilitator
Vinney Polletta	Highway Department	Core Team, Facilitator
Dean Kochanowski	Fire Chief	Core Team, Facilitator
Peter Peloquin	CMRPC	Core Team, Facilitator
Andrew Loew	CMRPC	Core Team, Facilitator

The Workshop’s goal was to identify the four top natural hazards that impact Dudley and develop strategies to enhance the town’s resiliency related to climate change. Following the CRB work plan process, CMRPC facilitators and planners gave three presentations:

- Overview of the CRB process and the MVP program.
- A summary of climate change projections, impacts and mitigation strategies
- A detailed profile of natural hazards in the Town of Dudley, including the top four hazards perceived by the core team.

Upon completion of the presentations, the group discussed the top four hazards that affect Dudley. There was much discussion by the group deciding the fourth hazard. Earthquakes and extreme temperatures were debated for roughly fifteen minutes. An informal vote was taken of the group with extreme temperatures winning the majority vote. There was final agreement

between the Core Team and all participants that--in no particular order-- **flooding, wind events, winter storms** and **extreme temperatures** have the greatest effects and potential effects on the Town. Having identified these hazards, workshop attendees were then broken into five groups to work through the CRB program's matrix and mapping exercise. Table facilitators, along with CMRPC staff guided stakeholders in small groups to examine the resources throughout the town and to identify the town's most serious concerns regarding natural and climate-related hazards that threaten their community.

After lunch, Peter Peloquin presented examples of projects from other municipalities in the state that were funded by MVP Action Grants, providing inspiration for participants to:

- Develop and prioritize actions to reduce or mitigate threats.
- Identify opportunities for collaboration aimed at increasing the town's resilience.

The groups then reconvened to build upon the morning work. The goal of the afternoon breakout session was to identify actionable items to reduce or mitigate the projected impacts of climate change. Once each table had completely filled out the matrix, all the groups reconvened and gave a summary of findings by the table reporters. The workshop ended with each attendee voting for what they believed to be the top project in the infrastructure, society and environmental categories.

Thirty-four (34) people attended the CRB Workshop, including representatives from the town government, emergency services, the MVP Core team, Municipal Department Heads, Shepard Hill Regional High School, local business owners, Nichols College and concerned citizens of Dudley.

A public listening session to discuss MVP results and recommendations for future actions was held on February 24, 2020 prior to a regularly scheduled Board of Selectmen's Meeting. The listening session and Board of Selectmen's meetings were properly promoted across several avenues, with a combined eighteen (18) residents including all five selectmen in attendance. Between the two meetings, a total of forty-nine (49) people participated in the MVP process.

### Top Hazards

Following the presentations at the beginning of the workshop, a full-group discussion was held for approximately fifteen minutes to determine the top four hazards for breakout groups to further assess solutions. Taking climate change projections, critical infrastructure, and other considerations into account, workshop participants chose to focus on the four following hazards. They are presented in no particular order: **flooding, extreme temperatures, winter storms, and wind events.**

In 2016, Dudley experienced extreme droughts along with the majority of the state of Massachusetts. Severe storms, including high winds and intense rainfall, have been increasing in frequency and impact. All of these have caused disruption to the town, including localized

flooding, power outages, and calling upon mutual aid agreements. With climate change, all of these natural events are expected to increase in severity and frequency.

#### EXTREME TEMPERATURES



Projecting an increase of consecutive dry days, with the driest periods in the summer and fall. This leads to increased risk and stress on drinking water systems and wildfire potential.



#### FLOODING

Expected increase in precipitation across all seasons. Heavy rainfall will become more frequent, increasing the risk for flash floods. Also increases non-point source pollution.



#### WINTER STORMS

Annual days below freezing will decrease, winter precipitation falling as rain or freezing rain. This increases risk for ice storms and flash flooding when rain falls on frozen ground.



#### WIND EVENTS

Intensity of storm events is expected to increase due to the warmer atmosphere. This will lead to increased severe thunderstorm and hurricane activity with higher wind

**Flooding.** Extreme weather in recent years demonstrates how the various hazards impact the town. There have been numerous flooding events over the years. Potash Brook is a town-wide area of concern and has a history of flooding. Areas surrounding Potash Brook, including West Main Street, are at higher risk to these flood events. Specific areas with critical infrastructure have been shown to be prone to flooding, thereby creating a variety of safety concerns. Areas with frequent drainage issues include Route 197, Route 131, and Route 12.

**Winter Storms.** Winter ice storms, a regional problem, are expected to be more intense and include more mixed precipitation which is highly damaging to trees, power lines and other infrastructure.

**Extreme Temperatures.** Wildfires are expected to increase due to the impact of prolonged droughts and extreme heat. Drier forests and wooded areas will be more combustible in drought conditions. Drought will also lead to water shortages that will impact the entire town whether or not residents and businesses are on town water or have wells.

**High Wind.** Heavy wind events are a serious concern. The town and the surrounding area have experienced a recent uptick in storms with hurricane-level winds including an EF-1 Tornado. While this phenomenon can be linked to extreme temperatures and rising precipitation rates, workshop participants felt it was serious enough to be singled out as a hazard. Thus, the fourth hazard is focused primarily on the winds associated with these storms, leaving heavy rain events to be discussed under flooding.

The workshop participants agreed that different hazards affect the town at different times of the year. Flexibility and comprehensive response by town officials is needed to ensure the safety of the citizens in different hazard situations exacerbated by climate change.

These concerns, which are largely inter-related, are based on data provided by the Massachusetts Climate Clearinghouse as well as watershed-specific data from the Northeast Climate Adaptation Science Center (NE CASC) at the University of Massachusetts at Amherst. For the Quinebaug and French River Basin, where Dudley is located, projections show an expected increase in precipitation overall, with the greatest increase during winter. The number of days with more than 2" of rainfall, potentially leading to inland flooding, is also expected to increase with the average expected to be close to 15 days by the year 2100 compared with approximately 10 days now. Consecutive dry days and days above 90 degrees Fahrenheit are expected to increase, leading to drought. Days at the wintery-mix level of cold are also expected to increase, leading to a greater likelihood of freezing rain in the winter. Higher wind in the summer and storm severity increases with warmer temperatures.

### SUMMARY OF FINDINGS

Overall, the workshop was received positively by all in attendance. Following the presentations, participants were asked if they agreed with the core team's identification of, in no particular order, flooding, wind events, winter storms and extreme temperatures as the primary hazards facing Dudley. All the participants agreed that these four hazards were the most relevant for Dudley.



Available schools and emergency trainings were described as strengths, along with the available senior programs and the Dudley Conservation Land Trust. The local bylaws and public resources were considered to be an overall strength for the town. Flooding and stormwater management were considered to be a vulnerability, along with the large number of dams in town.

Areas in and around the Jericho neighborhood are considered vulnerable. The Merino Pond Dam, Lower Merino Pond Dam, Carpenter Road Pond Dam, and the Packard Pond Dam are safety and public health hazards. Studying removal or replacement options for these dams was discussed and supported by a majority of participants.



Another area that was widely seen as prospect for action was the Joshua Place apartments. The Joshua Place apartments, which serve as housing for low-income elderly and persons with disabilities, requires housing upgrades, backup energy sources, and an additional egress. Other vulnerable areas mentioned were issues of overall tree health and tree maintenance systems, a lack of stormwater management and the need for back-up power in public buildings. There was concern about the need for a higher level of emergency communication equipment and for expanding communication resources to vulnerable populations in town. Recommendations included upgrading emergency communications systems and increasing cellular service throughout the Town.

Similarly, to that of the Joshua Place apartments, a vulnerability was identified at both Sheppard Hill High School and the Mason Road Elementary School. Due to a lack of an additional egress, access to and from the school, particularly during emergencies is a hazard for the community.

There was agreement that the Town's water and sewer pumping stations needed to be upgraded and outfitted with alternate power sources to provide for the expansion of both water and sewer throughout the town. Many asked for greater public education regarding water conservation, flooding and drainage issues at homes with private wells or septic tanks, and insect-borne diseases.

All five tables identified specific vulnerable locations that are already in need of attention and will likely face worsening impacts due to climate change. These include the town-wide dams, senior housing, public water system, and state-owned roads.

## CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS AND CLIMATE CHANGE

CMRPC, the MVP planning provider, had the unique advantage of preparing Dudley's Hazard Mitigation Plan (HMP), which was adopted by the Town's Board of Selectmen and approved by FEMA in April 2019. Meetings with the MVP Core Team prior to the workshop as well as the HMP helped to identify past climate-related events that significantly impacted the Town. Disaster events of concern included frequent major winter storms (as in 2015 and 2018), ice storms (2008), severe rain events (2005, 2010, 2016), tropical storms (Irene, Sandy), infestations of invasive and otherwise undesirable species (Asian Longhorn Beetle, gypsy moths, aquatic invasive species, ticks), and extended periods of drought (2015 to 2016). Dudley has fair public water coverage and maintains three well sources. Advisedly, it will be important for the town to maintain a backup and response plan in the event that one or more wells is damaged by drought or storm and cannot be replenished at the prescribed rate of use.

At the workshop, CMRPC staff presented downscaled climate change data provided by Massachusetts's Executive Office of Energy and Environment Affairs (EOEEA) and the Northeast

Climate Science Center at the University of Massachusetts, Amherst. Dudley lies mostly in the Quinebaug River Basin and the French River Basin, and should projections for the watershed hold true, by mid-century, annual average temperatures will increase in the range of 3 to 6.4 degrees from the historical baseline. Hot days over 90 degrees will increase 9 to 30 days annually; days below freezing will fall 19 to 38 days annually; annual precipitation will increase 1.2 to 6.3 inches. Seasonal drought conditions will become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snowpack is reduced. Some of the challenges of these projected changes – many of which are already being observed – were discussed in a presentation at the workshop focused on specific hazards in the Dudley area.

Challenges highlighted in the presentations and/or discussed as a group or in the breakout groups included:

- In general, attendees cited concerns that climate change will exacerbate problems that are already apparent and the town lacks the resources to address comprehensively – flooding and storm water management, vulnerable roads, ecological damage, and vulnerable populations, all within the context of a small community.
- An increase in hot and warm days and decrease in cold days will mean increased need for cooling and less need for heating, especially among vulnerable groups such as children and seniors.
- Increased temperatures can also be expected to cause changes in the water cycle, leading to more intense rain events. Increased precipitation rates will lead to more frequent and severe flooding in areas outside of designated flood zones defined using historical data – particularly around the Quinebaug and French Rivers, and along West Main Street (Route 197).
- Increased storm intensity will likely cause more tree damage leading to power outages and road closures, higher peak river flows requiring new approaches to storm water management, and increased erosion of river and brook banks and nearby infrastructure. Severe storms will still likely damage and impact the power lines throughout the town and especially the overhead transmission lines. Tree damage will occur from intense wind storms such as recent tornadoes or from heavy snow and ice storms.
- More frequent and severe droughts will challenge water supplies and increase risks from wildfire. Increased risk of wildfire can lead to a wide-range of ecological outcomes including increased damage to human property and life, removal of suitable habitat space, and changes in ecosystem services made available by forest cover.
- Invasive plant and animal species can impact public health through increasing numbers of disease carrying pests (e.g., ticks and mosquitoes) and by damaging key ecosystems such as forests and wetlands, thereby increasing wildfire and flood risks.

As the climate continues to change and natural disasters increase in frequency and strength the need to communicate with residents, businesses, and other institutions. Changing climate will dictate the need for enhanced communications systems and related infrastructure and flexible emergency response and evacuation plans. These flexible response and evacuation plans will be particularly important for the senior citizens who live alone and do not have access to a vehicle.

## VULNERABLE AREAS

The locations in Dudley identified by workshop participants during discussion as vulnerable to the hazards discussed include areas near high-risk dams, forested areas, roadways that frequently flood, and neighborhoods with vulnerable populations that might need assistance in times of emergency.

**Town-wide Dams** were of concern to many in attendance, and were discussed at all five workshop tables. The Merino Pond Dam, the Lower Merino Pond Dam, and the Carpenter Road Pond Dam were of particular concern. The Gore Pond Dam, also known as the Baker Pond Dam, recently received a Certificate of Non-Compliance and Dam Safety Order. All of these dams were thought of to be studied for removal or replacement.

**Localized Flooding** was identified along West Main Street, Southbridge Road, and Schofield Avenue. Higher density rainfall events coupled with undersized culverts are a major contributing factor.

**Senior Housing** was considered vulnerable by all groups during the breakout sessions. A lack of back of backup power was concerning for many due to the projected longer period of higher temperatures. In addition to better emergency planning, the availability of transportation for, and communications with, the senior population during these times is considered to be a key aspect of resiliency that needs upgrading and rethinking.

**Water Systems** in town were identified as at risk for pressures with flooding and drought. The limited extent of the water system could leave populations in Dudley without water during times of drought or extreme heat. This will put residents at risk of limited drinking supply and limited firefighting water sources.

**Forested Areas** throughout town are vulnerable to increasing pressures from heat, drought, and invasive insect species. The aging tree population is of concern for the overall health of the forested area covering most of the Town. Roadside trees are also a vulnerability due to a lack of a funding for tree trimming programs.

## VULNERABLE AREAS

- Dams
- Senior Housing
- Localized Flooding
- Water System
- Forested Areas

## SPECIFIC CATEGORIES OF CONCERNS AND CHALLENGES

The following topics were identified by workshop attendees as concerns or challenges related to Dudley's changing climate and natural hazards.

### Infrastructure Concerns



#### *Dams*

Dudley has 31 regulated dams in total throughout the town. Of these 31 dams, 2 are designated as High Hazard, and 13 are designated as Significant Hazard. Dams assigned as High Hazard are those where failure or improper operation will likely cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads. And dams that are designated Significant Hazard are those where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads, or cause interruption to use or service of relatively important facilities. Three dams that were noted of concern by attendees were the Merino Pond Dam, the Lower Merino Pond Dam, and the Carpenter Road Pond Dam. The Merino Pond Dam is designated as a High Hazard dam and is located between Merino Pond and Low Pond in the eastern part of town. The Lower Merino Pond Dam is also designated as a High Hazard dam and is located in very close proximity to the Merino Pond Dam. The Carpenter Road Pond Dam is designated as a Significant Hazard dam in unsafe condition, and is on the state list of 100 critical dams. It is located in the southern part of town. All three of these dams are town-owned, and there are another seven town-owned dams in Dudley. In addition to these, the Gore Pond Dam, also known as the Baker Pond Dam, recently received a Certificate of Non-Compliance and Dam Safety Order, and was deemed a potential threat to public safety. Along with the publicly owned dams, there are 21 privately-owned dams, five of which are Significant Hazards, which will pose additional obstacles due to ownership.

### INFRASTRUCTURE

- Dams
- Flooding/Stormwater
- Water Service
- Municipal Facilities



Gore Pond Dam, Photo courtesy of Michelle Jervis

### *Flooding and Stormwater Management*

Stormwater management was another major concern noted by participants as several roads in town experience localized flooding issues. With heavier and more frequent rains, flooding and road conditions in these areas are expected to worsen. This was of particular concern along all state-owned roads in town. Lack of action or upkeep has resulted in major flooding issues at the intersection of Route 197 (West Main Street) and Center Road and at the intersection of Route 197 and Prospect Avenue. Route 131 (Southbridge Road) and Route 12 (Schofield Avenue) were other areas of concern as they were identified as having poor drainage. Culverts along these three roads are in poor condition and need upgrades, especially on West Main Street in front of Yummy's Restaurant and on West Main Street in front of the post office. Flooding along these major routes can be a public safety risk as it could impede travel in times of emergency, cause roadway destruction, or cause flooding and contamination of the water and sewer systems in town. Relations with the Massachusetts Department of Transportation should be improved so that these issues can be collaborated on at the state and local level.

### *Water Service*

Water services were also seen to be at-risk by participants. A lack of coverage and limited water sources was widely discussed. The town is served by underground aquifers in three wells, and while it is a strength that the town provides some water, large portions of the town lie outside of the water service district. Climate change projections indicate that there will be an increase in consecutive dry days and hotter temperatures. Residents in these rural areas outside of the water district will be at greater risk from drought impacts. As drought worsens, fuel load in forests and fire risks will also worsen, leaving these residents vulnerable to wildfire. If fires are not an issue, access to drinking water will be. With more dry days, well pump outage could increase and will lead to emergency water needs.

The current water system infrastructure was also discussed as an area of concern. Existing water wells, storage tanks, and water mains were noted to be old and in poor condition. And both the public and private water wells are at risk from flooding and drainage issues. Flooding could cause runoff pollution to contaminate these wells, making the water unusable. Similarly, the sewer system was also noted to be a concern. The sewer station lacks back up power generators, and could pose a health risk if it stops functioning properly.

### *Municipal Facilities*

Dudley is fortunate to have a number of Municipal facilities throughout town, however, many of these facilities have limited access. The Recycling Center, Highway Department and Animal Shelter are all located off of West Main Street along Indian Road. This road has only one access point, leaving these facilities vulnerable and also could prevent residents from receiving those services in times of emergency. Especially in times of flooding on West Main Street, these facilities will be cut off without a second egress. The Shepherd Hill Regional High School and the Dudley Middle School are located on Dodge Way. The only access point to these schools is via

Dudley Oxford Road. These facilities act as the town’s shelter and could be difficult to access in times of emergency without a second egress.

In addition, it was noted that the electrical grids and power supplies in town are vulnerable. With increasing temperatures, households and buildings throughout town will likely need to increase air conditioning usage. These increased a/c loads could pose threats to the existing electrical grid. The overhead powerlines are also at risk from damage by fallen trees and limbs. Relations with the utility companies should be improved to expand mitigation efforts of these threats.

## Societal Concerns



### *Senior Residents*

The Dudley Housing Authority, more commonly referred to as Joshua Place, is a state-aided Public Housing Agency that provides housing for low-income elderly and persons with disabilities. It is located at 22 Joshua Place just off of Route 197. While attendees viewed this facility as a strength, it was acknowledged that housing upgrades and additional housing units are needed. In addition, every table noted concerns for the residents living there. These residents will need greater assistance in times of emergency. Senior citizens will feel the effects of climate change more than other residents in town. Due to their age, they will be more vulnerable to extreme temperatures and the limited drinking water supply that will accompany drought and hot days. In addition, older residents are more susceptible to disease, particularly EEE and other insect-borne diseases, which will only increase with the changing climate. And, older residents will be more defenseless in times of emergency when evacuation is necessary due to their reduced ability to mobilize quickly. The only access to Joshua Place is via West Main Street; a route that frequently floods. With their already limited access to transportation, a flooding event could limit their evacuation ability even further. Physical health status, psychological well-being, and social characteristics will make it more challenging for senior residents to move, recover, or evacuate quickly in the time of crisis.

## SOCIETAL

- Senior Residents
- Vulnerable Populations
- Communication

### *Vulnerable Populations*

Dudley has several groups of people that are at higher risk from the effects of climate change. Similar to the senior residents in town, these people will need additional assistance and planning considerations. Low-income, renters, and the homeless community, as well as the homeschooled and transient school populations were all noted to be of concern.

The Jericho neighborhood is located in the eastern portion of Dudley. It is bordered by the French River on the east, and Low Pond and Merino Pond on the south and southwest sides. Its close proximity to the French River puts this neighborhood at risk for flooding events. And because it immediately abuts the Lower Merino Pond Dam, should that dam fail, the

neighborhood could face severe damage to homes and businesses, and potential loss of life. The neighborhood is comprised of a larger renter and low-income population with limited means of transportation. During times of flooding, dam failure, or other weather-related disasters, these low-income residents would need to walk to shelters or might not be able to access them at all. Aside from the flooding risks, this demographic is also vulnerable during times of extreme heat or drought. With limited income, it is possible that these residents do not have access to air conditioning and will need to walk long distances to find cooling relief.

A homeless camp is located nearby the Jericho neighborhood, just off of Oxford Avenue between Dudley Elementary School and the French River. These residents are extremely vulnerable to the effects of climate change. They lack adequate shelter from storms, drought, and extreme heat. In addition, they lack regular access to drinking water. And, they may not have access to information resources and could be cut off from emergency communications throughout town. This area in particular is vulnerable because it is within the 100- and 500-year flood area of the French River, increasing the risk of flooding to this population.

In addition, the homeschooled and transient school populations face additional challenges. The homeschooled residents lack access to a communication network in town. And the Southern Worcester County Educational Collaborative and Nichols College house students for only part of the year. These residents may lack knowledge of Dudley as well as a means of accessing emergency notifications.

### Communication

The current communication system in Dudley uses copper wiring and is in need of upgrading. Communication systems used by the public safety departments and Town Hall are also in need of upgrading. There were also concerns regarding town-wide emergency communication. On July 1, 2019, Dudley changed over from Code Red to the RAVE Emergency Alert System. Since residents must opt into the emergency alert system, efforts should be made to increase the number of people subscribed.

In addition to the system concerns, there was also discussion about inclusion and addressing the communication needs of non-English speakers. Immigrants and non-English speakers are prevalent throughout town. There are a number of language barriers with these communities, and as a result, these populations do not have sufficient access to emergency notifications or understanding of the evacuation protocols.

### Environmental Concerns



#### *Insect-Borne Disease*

Risk of insect-borne diseases, especially EEE and Lyme disease, will worsen as the climate warms and periods of flood and drought increase. Mosquitos carry EEE and West Nile Virus (WNV).

### ENVIRONMENTAL

- Insect-Borne Disease
- Forest Management
- Water Resources

They tend to lay their eggs in and around standing water, so populations of mosquitos will likely increase in times of flooding. Mosquitos are also more aggressive on hot, dry days, and will feed more frequently during those periods, causing greater instances of contracting those diseases. In Massachusetts, deer ticks (*Ixodes scapularis*) can carry Lyme disease. Typically, deer ticks will die out during the cold winter months, controlling the deer tick population and managing the spread of Lyme disease. However, climate change will result in milder and warmer winters, causing fewer disease-carrying ticks to die out during those winter months. With fewer ticks dying, the overall tick population will increase, creating a greater chance of contracting Lyme-disease. Children and senior citizens are more susceptible to the effects of insect-borne diseases, and those living near open water or flood-prone areas could be more exposed to insect-borne diseases. Education and prevention measures of insect-borne disease should be taught town-wide.

### *Forest Management*

About 55% of Dudley is forested, and another 15% is vegetated. Each of these areas are at risk from drought and invasive species. Both drought and invasive species can lead to increased fire load and risk of wildfires. The Town of Dudley has already experienced 107 wildfire incidents in the last ten years, totaling 71 acres burned. With an increase in temperatures and numbers of consecutive hot days, drought, and consequently more wildfires, will be an ongoing hazard. Along with drought, climate change will bring a shift in flora and fauna of the region. Plants and animals that have adapted to warmer and drier climates will increase in Massachusetts, and native species that are better adapted to cooler weather will decrease. When a non-native species invades an area, it can often outcompete the native species. And without a predator to manage population numbers, invasive species can dominate an ecosystem very quickly. This is especially detrimental to forest ecosystems. Attendees noted the gypsy moth and emerald ash borer as invasive insect concerns. While these insects typically do not have direct harmful effects to humans, they do have disastrous effects on native tree species in Massachusetts. The gypsy moth prefers to feed on oak and birch trees, amongst other species, while the emerald ash borer feeds on ash trees. Trees that are impacted by invasive insects are much more vulnerable to damage during intense storm events as well as drought. Street trees impacted by these hazards pose risks to overhead powerlines, especially since Dudley lacks a sufficient tree trimming fund.

### *Water Resources*

There is a need to better protect the existing water resources in town. The brooks in town, especially Potash Brook, were identified as having flooding concerns. Potash Brook is located in the southern portion of Dudley near West Main Street. With its close proximity to West Main Street, run off pollution from West Main Street could flow to the brook. There was also consensus between the workshop tables that the town should enact better enforcement of wetland area protections, particularly for flood mitigation. Lakes, ponds, and rivers were thought of as generally lacking preservation, funding, and upkeep. And it was noted that there was a lack of recreational opportunities along the water resources in town.

## CURRENT STRENGTHS AND ASSETS

Dudley has taken some steps to address natural hazards and climate change over recent years. Public opinion holds that the policies in town and the resources it provides are an “infrastructural strength” that will protect and strengthen the Dudley community. Programing available to senior citizens and the Dudley Conservation Land Trust are other perceived strengths that help fortify the town.

### Infrastructure Strengths



#### *Policies*

While more needs to be done to address flooding issues and to protect natural resources in town, there are a number of policies in place that can be used to enforce these efforts. The town upholds the Wetlands Protection Act (WPA) to help protect their wetland resources. And in 2008, Dudley approved their most updated Conservation Commission Bylaw. This bylaw further protects wetland areas and is more stringent than the WPA alone. Additionally, the Town of Dudley was granted the NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4 General Permit). This permit makes Dudley an MS4 community and mandates that the town perform some stormwater management.

### INFRASTRUCTURE

- Policies
- Municipal Resources

#### *Municipal Resources*

While some facilities in town are in need of upgrades or additional access, Dudley has a number of resources that are critical to the community. Dudley provides sewer and water services through the Water and Sewer Commission. The town sources water from underground aquifers in three wells. Water is then distributed through 35 miles of mains in two storage tanks. And they have implemented standard water use restriction policies to preserve water supplies as a preventative measure.

The Town Hall, located on West Main Street, holds various departments and provides a number of services to residents. There are four schools in Dudley. The Mason Road School is located at 20 Mason Road and provides education for preschool, Kindergarten, and grade 1. Dudley Elementary School is on 16 School Street and serves students in grades 2-4. Shepherd Hill Regional High School and Dudley Middle School are both located on Dudley-Oxford Road and they serve grades 9-12 and grades 5-8 respectively. The middle school also acts as the town’s shelter in times of emergency. And the Recycling and Transfer Station is located at the Dudley Highway Department on Indian Road.

## Society Strengths



### *Senior Programing*

The Dudley Senior Center is located at the Council on Aging on 71 West Main Street. From active programs like chair yoga, scrabble, and cribbage, to resources for drug and alcohol treatment or Medicare assistance, the senior center provides a variety of services that engage and inform the senior community.

## SOCIETAL

- Senior Programing
- Education and Training

In addition, the Dudley Housing Authority provides housing at the Joshua Place apartments for low-income seniors and people with disabilities. While there is a need to add additional housing units, having an existing facility that can be built upon or improved is a great starting point. Tri Valley Inc. is a non-profit organization that provides services to seniors and people with disabilities to help them live independently and with dignity. Services they provide range from caregiver support, nutrition services, in-home services, and more.

### *Education and Training*

As noted above, there are four public schools within Dudley. Collectively, the Mason Road School, Dudley Elementary School, Dudley Middle School, and the Shepherd Hill Regional High School serve students in preschool all the way through grade 12. These schools provide education, after school programs, and a means for emergency notification to the students and their families. In addition to these public schools, there is also Nichols College and the Southern Worcester County Educational Collaborative. The town could benefit from sharing resources and facilities with these two schools. And, there is a homeschooled population that could and should be integrated better.

The Tri-EPIC Regional Emergency Planning Committee is a group that works to improve emergency response and preparedness in the Worcester County region of Massachusetts. The Town of Dudley is a part of this organization, along with Charlton, Oxford, Sturbridge, Southbridge, Webster, and Brimfield. Tri-EPIC has hosted a number of CERT (Citizen Emergency Response Team) trainings to help educate volunteers about disaster preparedness and basic disaster response skills.

## Environmental Strengths



### *Water Resources*

Dudley has a number of lakes, ponds, streams, and wetlands in town. Wetlands were noted to be valuable for both flood storage and runoff filtration, and should continue to be protected. The Merino Pond was noted as another strength because the attached town beach

## ENVIRONMENTAL

- Water Resources
- Dudley Conservation Land Trust

provides summertime recreation. The French River was also discussed as an important water resource, though there is a desire to grow recreational opportunities there.

### *Dudley Conservation Land Trust*

The Dudley Conservation Land Trust (DCLT) is a non-profit conservation organization that serves as an educational agency and encourages environmental stewardship throughout town. Participants highlighted the DCLT as a strength for its many accomplishments promoting the conservation, acquisition, and protection of land in Dudley. The DCLT owns and stewards eight wildlife and conservation sanctuaries in Dudley. In 2017, the DCLT received a grant to develop a Forest Management Plan for one of their properties, Wieloch Woods. And later in that same year, the DCLT approved a five-year strategic plan to focus its land acquisition, stewardship, education, and outreach efforts.

## RECOMMENDATIONS TO IMPROVE RESILIENCE

Workshop attendees at each table took the next step in completing the CRB Matrix by suggesting actions that would address vulnerabilities, or further bolster strengths they identified. The following actions are compiled from the matrices from all three tables at the Dudley MVP Workshop. The completed Matrix for each table can be found in Appendix B of this document.

### Infrastructure Actions



With 31 regulated dams in town, performing a **town-wide dam assessment** to prioritize the most deficient dams is a high priority. The Merino Pond Dam, Lower Merino Pond Dam, and Carpenter Road Pond Dam should all be studied for either removal, repair, or complete replacement. A design study was recommended for a replacement of the Packard Pond Dam. And the town should address the Certificate of Non-Compliance and Dam Safety Order that it received for the Gore Pond Dam (Baker Pond Dam).

### INFRASTRUCTURE

- Dam Assessment
- Roadway Maintenance
- Accessibility
- Improve Public Utilities

Improved **roadway maintenance** will be crucial to building resilience, especially as the number of storms and flooding events increase. Flooding and drainage issues should be addressed town-wide, particularly along West Main Street (Route 197), Southbridge Road (Route 131), and Schofield Avenue (Route 12). As these three main routes are state-owned, collaboration between the state and town will be essential. Along with flooding issues, storms could increase debris and blocked roadways from fallen trees. Increased funding should be explored to establish a consistent tree trimming and maintenance program as well as a gypsy moth monitoring program.

It was recommended that designs for a second egress at the Highway Department, Recycling Center, and Animal Shelter complex be engineered to **increase accessibility** to necessary equipment in times of disaster. Designing an additional egress at the Shepherd Hill Regional High School and Dudley Middle School complex is also recommended as the middle school serves as the town’s shelter. Evacuation plans throughout town should be revisited in order to account for the town’s most vulnerable populations. Transportation contracts should be checked and increased to ensure that seniors and low-income residents who may not drive or have a car will still have a means to evacuate.

With the number of concerns regarding all of the public utilities, efforts should be made to **improve the existing public utilities** in town and expand access where feasible. Dudley should look to increase the capacity of and extend the gas lines. Both the sewer system and the water system will benefit from generators or alternative energy sources to keep the systems operational in power outages. In addition, it was recommended that the old water mains be replaced. The projected increase in the occurrence of drought and hot days led to concerns for drinking water access. The town should promote stronger water conservation efforts and explore options for either installing new water sources or interconnecting the current system with surrounding towns.

### Societal Actions



Participants felt that the town would benefit from **increasing support of senior citizens** on a wide range of issues. Better communication with and outreach to the senior citizen community should occur before, during, and after emergencies. An evacuation and transportation plan specific to the senior citizens in town should be developed. This plan should account for limited mobility and disabled individuals who may have difficulties traveling long distances or using stairs. The shelter should upgrade services to address the needs of the elderly community. Sustainable food with low sodium options should be secured, as well as safe drinking water, medical devices, and medicines that are used to treat chronic illnesses.

### SOCIETAL

- Senior Citizen Support
- Vulnerability Assessment
- Emergency Resources

Existing senior housing should be upgraded and constructing additional housing units should be explored. The Council on Aging should research options to increase funding of senior programs and hours at the Senior Center. The town should also collaborate with Tri Valley, Inc. and advertise their services to the elderly and disabled community. Creation of a database of all seniors and veterans in town was mentioned as a means to track these individuals during a disaster event.

Discussions at the workshop highlighted a number of communities that will be at increased risk during times of crisis. A **vulnerability assessment** should be performed to address the needs of

these groups of people. The Jericho neighborhood could benefit from a comprehensive vulnerability study due to the vast majority of susceptible populations there including children, elderly, impoverished, and non-English speaking individuals. The town should establish a community liaison for the immigrant and non-English speaking populations. Resources for non-English speaking individuals should be shared between the schools, the public library, and with surrounding towns. And additional language options should be offered in times when emergency communication alerts are sent out. Communications with the homeschooled population should also be increased. The town should encourage these families to sign up for the RAVE system in order to develop a communication network with the town. And the town should research ways to connect the homeless population with emergency information, especially in times when evacuation is necessary.

Improving access to **emergency notification resources** was also suggested. Nichols College hosts their own radio station, FM 97.5 WNRC, and this station should be advertised to the town as a means of emergency notification. Maximizing the number of people subscribed to the RAVE Emergency Alert system will also be significant. And expanding the cell service in town should be considered.

## Environmental Actions



Risks of increased flooding and higher temperatures led participants to discuss improved **mosquito management** in town. Attendees recommended joining a regional mosquito control group to establish a larger collaboration on this issue. Encouraging a bat house program to help control the mosquito population was offered as a nature-based solution.

And increasing funding for spraying was also proposed. Mosquitos are carriers of a number of insect-borne illnesses, specifically EEE. Efforts to increase public awareness and knowledge of these diseases should be made. And hosting more vaccination clinics to help prevent these diseases was suggested.

A vulnerability assessment of the lakes, ponds, rivers, and forests in town should be performed to determine the preservation, upkeep, funding needs, and **improvements of these natural resources**. The town should also continue protecting wetlands and should reinforce existing regulations as this resource provides flood storage and wildlife habitat benefits. Potash Brook was noted as an area with increased flooding risk, so natural retention areas should be designed and constructed to improve flood storage in this location. Diligent management of the forests and clearing of debris should be considered as a means for reducing the fire load. And establishing pest monitoring programs could also help in these efforts.

## ENVIRONMENTAL

- Mosquito Management
- Natural Resource Improvements
- Open Space Stewardship

Engaging in town-wide **open space stewardship** was recommended to help fortify the town as the climate continues to change. The town should investigate funding options to purchase land for either protection or development for community good. Coordination with the Dudley Conservation Land Trust was suggested to help reinforce their efforts. Availability of recreational opportunities appeared to be lacking in town, so the town should look to increase these offerings, especially at the French River.

## Top Recommendations

Prioritization of recommendations was achieved through four steps: 1) informal discussion at each breakout table during the workshop; 2) voting using stickers placed on the participant's table's CRB matrix (each attendee was given five stickers to select his/her top priority actions, with at least one sticker required to be used for each general topic area); 3) summary's from each table to the full audience to discuss and discern consensus priorities; and 4) final review and reconciliation of duplicate priorities.

Several tables mentioned similar concerns and suggested similar ways to address them, but each table had a unique perspective on the challenges Dudley faces. These recommendations were organized on a large sheet to enable participants to see the overlap between tables and to learn about suggestions not discussed at their table.

The overall top recommendation is to complete a dam removal v. replacement assessment of the **Merino Pond, Lower Merino Pond, and Carpenter Road Pond Dams**. All five workshop tables recommended investigating **new water sources** or interconnecting with surrounding towns. The top societal action is to provide **shelter and housing upgrades for the elderly**, specifically at **Joshua's Place**. Other recommended actions agreed upon by the majority include increasing education and action on **insect-borne diseases**, as well as implementing a town-wide **drainage study** to assess the roadway flooding throughout town.

At the end of the workshop, Peter Peloquin thanked attendees for giving their time and attention, and announced several of the actions with the most votes. The following top recommendations were compiled based on those actions reported out by each table and those actions that participants voted for. Actions are organized by priority and project type.

### TOP RECOMMENDATIONS

- Merino and Carpenter Dams Removal Assessment
- Investigate Water Sources
- Upgrade Senior Housing
- Insect-Borne Diseases Awareness
- Drainage Study

Theme	Project Type	Category	Location	Recommended Action	Hazard
<b>High Priority</b>					
<b>Water</b>	Dams		Merino / Lower Merino	Perform dam assessment - Removal vs. Repair: estimate engineering and financial cost to design, permit, and construct. Ensure cost avoidance.	
			Carpenter Rd.		
			Townwide		
	Wells		Townwide	Ensure backup power to town wells, promote stronger water conservation efforts in new construction. Estimate current standing of the watertable and address potential impacts (property value, health of aquifer, etc.) Potentially scout for new water sources.	
	Water Supply		Schofield Ave.	Work on retention and collection of water through private and town owned wells.	
			Townwide	Study required to explore new options that can be interconnected with current supply. Investigate additional town sites for water supply - continued water supplies for possible drought conditions. Construct a water management plan.	
	Drainage		West Main St. at Marry's and the Fire Station	Need to engineer pipe in front of post office to further improve drainage. Need a S.W study. Keep fire station drainage operational and efficient.	
			Townwide	Engineer, repair, or replace existing. Need S.W study for Dudley-Southbridge. Improve drainage assistance to homeowners.	
			Route 131	Introduce more retention ponds, add in swales, rain gardens, and replace the pipes with larger ones.	
			Route 12		
	Stormwater Management		Townwide	Keep management bylaws as an updated working document and maintain public awareness. Review bylaws for zoning of stormwater. Action needed to do a study for vulnerable areas to determine problematic sites (mandated by EPA/DEP)	
			Intersection between 197 and Center Rd.	Work with MassDOT to work on flood management	
			Intersection between 197 and Prospect Ave.		Construct culverts to divert stormwater management. Make repairs for flooding.
			Intersection of Center Rd. and West Main (in front of Yummy's Restaurant) + Post Office		
	Greywater (Septic and Sewage)		Townwide Sewage	Engineer, repair, or replace.	
			Pump Station #6	Sewer station needs generators or alternative power solutions (sewage is a health risk to community), replace older transite water mains.	
Private Septic			Need a CDBG program to construct new systems.		
Townwide Septic			Preventative maintenance and system vulnerability assessment needed. Rebuild infrastructure.		
<b>Roads</b>	Access		Indian Rd. highway and shelter	Engineer and construct a second access. Make the access road to the Highway Dept. wider.	
			SHRHS/Middle School on Oxford Rd.	Engineer and construct a second access with sidewalks.	
			Town Buildings (Highway Dept.)	Construct new access roads	
<b>Invasive Species/Insect/Disease Control</b>	EEE		Townwide	Institute early warning, public awareness, research coalitions, environmental safety precautions, and training education needed. Consider joining regional moquito control or introducing bat houses. Open more vaccination clinics.	
	Invasive Pests			Increase communication and awareness about invasive species in waterbodies.	

Theme	Project Type	Category	Location	Recommended Action	Hazard
<b>Medium Priority</b>					
Communication	Information Technology		Town Hall	Purchase and install equipment training system for I.T	
			Townwide	Create continuity and backup of services.	
	Communication Infrastructure		Townwide	Change all copper wiring to fiber line and upgrade equipment. Better communication between civic groups for sharing resources and information.	
	RAVE			Maximize number of people subscribed. Improve cell service for use of RAVE. Provide access to homeschooled families to use RAVE system.	
	Community Engagement		Townwide	Introduce community gardens and information about local agriculture. Begin providing welcome services for new residents (welcome and emergency systems packets).	
Utilities	Gas Lines		Limited Extent of Town	Increase capacity and extend gas lines.	
	Powerlines		Townwide	Stay on tree trimming program (follow street tree bylaw of 20-25 ft). Increase funding.	
	Electric			Use alternative energy sources for key utilities, institutions, as well as build stronger relationships with utility companies. Removal and replacement of trees also needed for this.	
	Tree Trimming			Work with utilities to clean up trees. Work on getting a gypsy moth program.	
Roads	Evacuation Routes		Townwide	Revisit evacuation plan (for town and schools) and check contacts for emergency transportation. Post evacuation signs for public, repair sections of the road and drainage for easier access to routes.	
	Sidewalks			Provide sidewalks around new facilities and schools to gain more access for public.	
Elderly/Veteran Community	Senior Housing		Joshua Place	Consider shelter upgrade with a conversion to an alternative power source. Provide more transportation and communication to seniors during outage or storm events. Create a senior safe program that works with the COA.	
			Townwide	Construct more housing units with a plan for emergency transportation for non-mobile residents.	
	Elderly Programs		Senior Center	Invest in advertisement.	Provide more hours for the senior center as well as more funding to maintain census of senior/veteran/disabled population. Provide better communication resources for outreach during emergencies.
Low Income/ Homeless/Non-English Speaking Community	Low-Income		Jericho	Do a comprehensive vulnerability study (children, elderly, drugs, language, and poverty). Provide better communication and transportation for cooling centers, shelters, and for emergency services. Provide resources (rehab and transportation) for disabled citizens.	
	Education		Townwide	Provide a community liaison to non-English speaking population. Ensure resources to school and the public library.	
	Homeless		Homeless Camp	Find resources for aid (state agency, backpack bridge, or non-profits). Provide access to communication systems and information for their safety.	
Forest Management and Conservation Land	Forest		Townwide	Do a vulnerability assessment of the forest and provide a debris and forest management program.	
	Regulation			Have the Conservation Committee review any town policy or bylaw changes, and take initiative on those changes.	
Forest Management and Conservation Land	Conserved Land		Townwide	Find more funding for preservation. Coordinate and reinforce conservation practices on land that is already protected.	
	Open Space			Investigate funding options to purchase/develop for community good.	
<b>Low Priority</b>					
Recreation	Park		West Main	Develop a park in such a way to mitigate hazards. Provide both walking trails or track and a dog park.	
			Townwide	Do vulnerability assessments for bodies of water that are used recreationally.	
	Lakes, Rivers, Ponds		French River	Work with other adjacent communities to attain grant money and other funding to provide a recreational area and further maintain preservation efforts.	
Wetlands and Waterbodies	Protection		Townwide	Continue to protect with enforcement. Maintain and enhance preservation, funding, and maintenance of waterbodies and wetlands.	
	Reinforcement		Potash Brook	Create larger culverts and more efficient retention ponds. Work on developing for efficient natural retention ponds and flood/stormwater storage.	
			Townwide	Introduce flood mitigation efforts for waterbodies. Enhance stormwater management for surrounding brooks and streams.	

## APPENDIX A

- I. Agendas and Sign-in Sheets
- II. Workshop Agenda and Sign-in Sheet
- III. Listening Session Agenda and Sign-in Sheet
- IV. MVP Program Information
- V. Workshop Base Maps
- VI. Table 1 Materials
- VII. Table 2 Materials
- VIII. Table 3 Materials
- IX. Table 4 Materials
- X. Table 5 Materials
- XI. Summary of Recommended Actions
- XII. Hazard Mitigation Plan – Mitigation Strategies
- XIII. Workshop Presentation
- XIV. Listening Session Presentation



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**Dudley Municipal Vulnerability Preparedness (MVP)**  
**Pre-Kickoff Meeting**

**Date/Time:** August 14, 2019 1:30 PM  
**Location:** Dudley Town Hall, 71 West Main Street, Dudley, MA

**AGENDA**

- Introductions
- MVP Program Background
- Roles & Responsibilities
  - CMRPC
    - Organize and lead Core Team meetings
    - Organize and lead workshop, including preparation of presentations and other materials (maps, handouts, etc.)
    - Organize and lead public listening session; assist with outreach
    - Prepare and submit summary of findings report
  - Town
    - Assemble Core Team (participates in prep meetings, workshop and listening session)
    - Identify stakeholder to invite to workshop and lead invitation/RSVP process
    - Lead outreach for public listening session
    - Provide feedback on summary of findings report
    - Grant reporting and documentation of in-kind match
- Workshop Agenda/Structure
  - Welcome speaker(s) (Town)
  - Content speakers (CMRPC)
  - Table facilitators (generally Town or other local stakeholders; CMRPC will assist)
  - Table reporters (Town or other local stakeholders)
  - Scribes (generally students/seniors)
  - Food (can be funded through grant)
- Nuts and bolts
  - Workshop location options?

Other/next meeting



# Town of Dudley Municipal Vulnerability Preparedness Planning

MVP Meeting Pre-kickoff – Wednesday, August 14 2019

	Name	Organization/Department	Phone	Email
1	GEORGE PATRINOS	WATER / SEWER	777-230-5396	water.sewer@dudley.ma.gov
2	Don Johnson	Town Planner	508-949-8000	
3	JONATHAN RUDIA	Dudley, TA	508 949 8001	jrudia@dudleyma.gov
4	PETE PELOQUIN	CMRPC		
5	Andrew Loew	CMRPC		
6	VINCENT POLLETTA	Highway	508 949 8020	DUDLEYHighway1@ CHARTER NET
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**Dudley Municipal Vulnerability Preparedness (MVP)**  
**Kickoff Meeting**

**Date/Time:** September 24, 2019 1:30 PM  
**Location:** Dudley Town Hall, 71 West Main Street, Dudley, MA

**AGENDA**

- Introductions
- MVP Program Background
- Core Team Timeline
  - Core Team Meetings 1 and 2
  - Pre-Workshop call and Workshop
  - Listening Session
- Workshop Agenda/Structure (**January**)
- Workshop roles & responsibilities for CMRPC & Town
  - Welcome speaker(s) (Town)
  - Content speakers (CMRPC)
  - Table facilitators (Town w/ CMRPC support)
  - Table reporters (Town)
  - Scribes (Town)
- Nuts and bolts
  - Logistics and IT situation
  - Food
  - Outreach plan(s)
    - Invitations
    - Stakeholders
- Presentations and maps to be developed
  - MVP Program; Climate Change Data; Profile of Local Hazards
  - Dudley Base Map; potential reference maps
    - Zoning, Dams, Evacuation Routes and Shelters, Land Use, Water/Sewer Systems, other
- Listening Session
  - Tentative dates
- Climate Concerns and Priorities
  - Focus hazards
- Match Documentation
- Other/next meeting



Meeting Name: MVP Kickoff

Community: Dudley  
September 24, 2019

Location: Town Hall  
Meeting Time: 1:30PM

Date:

Participant Name	Organization	Title	E-Mail
Andrew Loew	CMRPC	Proj. Mgr.	aloew@cmrpc.org
Don Johnson	Town of Dudley	Town Planner	planner@dudleyma.gov
Jonathan	CMRPC	Town Planner	adminstrator@dudleyma.gov
GEORGE PATRINCOS	Dudley Water/Sewer	Supt	ITG.PATRINCOS@gmail.com
Michelle Jervis	Town of Dudley	Administrative Secretary	Selectmen@dudleyma.gov
PETE PELOQUIN	CMRPC		
Steven Sullivan	Town of Dudley	Board of Selectmen	StevenPSullivan@yahoo.com



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[www.cmrpc.org](http://www.cmrpc.org)

**Dudley Municipal Vulnerability Preparedness (MVP)**  
**Meeting #2**

**Date/Time:** November 8, 2019 10:00AM  
**Location:** Dudley Town Hall, 71 West Main Street, Dudley, MA

**AGENDA**

- Introductions
- MVP Program Background
- Core Team Timeline
  - Core Team Meetings 1 and 2(Today)
  - Pre-Workshop meeting
  - CRB Workshop **January 10, 2020**; *Snow date January 24, 2020*
  - Listening Session **February 24, 2020**; *Snow date March 9, 2020*
- Workshop Agenda/Structure
- Climate Concerns and Priorities
  - Identify four (4) focus hazards
- Nuts and bolts
  - Logistics and IT situation
  - Table set up
  - Food vendor
  - Outreach plan(s)
    - Invitations
    - Confirmed guests
- Presentations and maps to be developed
  - MVP Program; Climate Change Data; Profile of Local Hazards
  - Dudley Base Map; potential reference maps
    - Zoning, Dams, Evacuation Routes and Shelters, Land Use, Water/Sewer Systems, other
- Match Documentation
- Other/next meeting



Meeting Name: MVP Kickoff

Community: Dudley

Location: Town Hall

Date: November 8, 2019

Meeting Time: 10AM

Participant Name	Organization	Title	E-Mail
GEORGE PATRINOS	DUDLEY WATER DEPT	Supt	WATERSEWER@dudley.ma.gov
Stanley Golenski	Dudley Highway Dept	Int. Foreman	stanley3g@charter.net
Bill Scanlan	Acting Town Planner		wvscanlan@gmail.com
Vinny PELLETTA	Dudley Highway Dept	SUPER	DUDLEYHIGHWAY1@CHARTER.NET
Hillary King	EPA MVP Central Regional Coordinator		hillary.king@mass.gov
Jon Ruda	Town of Dudley	TA	jruda@dudley.ma.gov
Andrew Loew	CMRPC	Proj. Mgr.	aloew@cmrpc.org
PETER PELOQUEN	CMRPC		
Katherine Jarvis	Town of Dudley	Admin. Secretary BS/TA	Selectmen@ dudley.ma.gov



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## Dudley Municipal Vulnerability Preparedness (MVP)

### Meeting #3

**Date/Time:** December 12, 2019 2:00PM

**Location:** Dudley Town Hall, 71 West Main Street, Dudley, MA

### AGENDA

- Introductions
- MVP Program Background
- Core Team Timeline
  - Core Team Meetings (#3 Today)
  - Pre-Workshop meeting/Call **Tuesday January 7<sup>th</sup> @ 10AM**
  - CRB Workshop **January 10, 2020 8AM – 4:30PM; Snow date January 24, 2020**
  - Listening Session **February 24, 2020 6:30PM; Snow date March 9, 2020**
- Workshop Agenda/Structure
- Workshop roles & responsibilities for CMRPC & Town
  - Table facilitators (Town w/ CMRPC support)
  - Table reporters (Town)
  - Scribes (Town)
- Climate Concerns and Priorities
  - Identify four (4) focus hazards:
    - ***Flooding/Wind Events/Extreme Temperatures/Winter Storms/Earthquake***
- Nuts and bolts
  - Logistics and IT situation
  - Table set up:
    - Single Matrix
    - Number of tables
    - Number of people at each table and table make up
  - Food vendor (Town)
  - Outreach plan(s)
    - Invitations Sent
    - Confirmed guests
- Presentations and maps to be developed
  - MVP Program; Climate Change Data; Profile of Local Hazards
  - Dudley Base Map; potential reference maps
    - Zoning, Dams, Evacuation Routes and Shelters, Land Use, Water/Sewer Systems, other
    - Review updated Stormwater maps
- Match Documentation
- Other/next meeting: Tuesday January 7<sup>th</sup> @ 10AM





# Community Resiliency Building Workshop

## Town of Dudley

### *Municipal Vulnerability Preparedness*

Friday, January 10, 2020

8:30am – 4:30pm; Registration at 8:00 am

Dudley Town Hall

71 West Main Street, Dudley, MA

## Workshop Objective

- Define extreme weather and climate related hazards;
- Identify current and future vulnerabilities and strengths;
- Develop and prioritize actions; and
- Identify opportunities for the Town to advance actions and reduce risks to build resilience



## Workshop Agenda

*8:00am – 8:30am Registration, Networking & Coffee*

*8:30am – 10am:*

- Welcome and Overview
  - Assistant Fire Chief Paul Konieczny
- MVP Program Overview
  - Hillary King, Central Region MVP Coordinator, EOEEA
- CRB Overview Presentation
  - Peter Peloquin, CMRPC
- Climate Change Projections and Impacts
  - Mimi Kaplan, CMRPC
- Profile of Natural Hazards
  - Andrew Loew, CMRPC

10am – 12pm

- Breakout Groups – Identify Hazards, Local Features, Strengths & Vulnerabilities

**12pm -1pm Lunch**

*1pm – 4:30pm:*

- CRB part 3 Overview – Peter Peloquin, CMRPC
- Breakout Groups – Identify & Prioritize Actions
- Table Reports and priority vote
- Closing Remarks and Wrap up

**Thank you for participating in Dudley's Community Resilience Building Workshop!**



Meeting Name: Community Resilience Building Workshop

Community: Dudley

Location: Town Hall, Selectmen's Room

Date: ~~December 12, 2019~~

Meeting Time: 8:30 am - 4pm

JANUARY 10, 2020

Printed Name	Organization	Title	E-Mail
Dean Kochanowski	Dudley Fire/EM	FIRE CHIEF/EMD	DUDLEYfirechief@DUDLEYMA.GOV
ALEXANDRA BURPEE	RECORDS & BURPEE	CO-OWNER	2005HOW3@aol.com
VINCENT POLLETTA	Dudley Highway	<del>SUPERVISOR</del> DEAN	Highway@DudleyMA.GOV
Ted Zajkowski	BUILDING DEPT	Clerk	Building@DudleyMA.GOV
Stanley Golenski	Dudley Highway	foreman	
Kevin Shaughnessy	National Grid	Community Manager	kevin.shaughnessy@nationalgrid.com
PETER PELOQUIN	CMRPC	ASSOCIATE PLANNER	
Catherine Benjamin	Gentex Optics	EHS Eng	cbenjamin@essilorusa.com
Stephen Rogerson	Veterans Office	Veterans Office	stephenr@DudleyMA.GOV
Andrew Loew	CMRPC	Proj. Mgr.	aloew@cmrpc.org
Bill Scanlan	Dudley	Acting Town Planner	planner@dudleyma.gov
Jonathan Androlewicz	Rampco Construction	VP	Jonathan@rampcoconstruction.com



Meeting Name: Community Resilience Building Workshop

Community: Dudley

Location: Town Hall, Selectmen's Room

Date: ~~December 12, 2019~~

Meeting Time: 8:30 am - 4pm

JANUARY 10, 2020

Printed Name	Organization	Title	E-Mail
Drusilla Carter	Pearle L Crawford Mem. Library	Director	dcarter@cmrpc.org
Peter Fox	Dudley Conservation L.T.	Member	FOXPE1@YAHOO.COM
Paul Wielock	"	President	Vishawielock@yahoo.com
Margaret Bussiere	Dudley COA	Div/Coord.	coa@dudleyma.org
Mark Ruggeri	Weeco Chemical / Bay Science	COO	markr@weecochemical.com CHRIDL1988@YAHOO.COM
Christopher Levesque	WEBCO Chemical	SAFETY commit	<del>CHRIDL1988@YAHOO.COM</del>
Lisa Prince	Tri-Valley, Inc.	Exec. Dir.	Lprince@tres.org
Tim Galvin	DUDLEY SEWER	MAINT	
Jen Courneyer	BOH / W/S		watersewer@dudleyma.gov
George Patrucco	Water / Sewer	Supt	watersewer@dudleyma.gov
DAVID HARRIGAN	DCCT	VICE PRES	NIRUANA1865@YAHOO.COM
Paul Konieczny	Fire Dept.	Asst. Chief	dudleyema@charter.net



Meeting Name: Community Resilience Building Workshop

Community: Dudley

Location: Town Hall, Selectmen's Room

Date: ~~December 12, 2019~~

Meeting Time: 8:30 am - 4pm

JANUARY 10, 2020

Printed Name	Organization	Title	E-Mail
Scott Ziskowski	Dudley Water/Sewer	Commissioner	SCOTT.ZASIKOWSKI@CHARLESTON.MA
ROBERT LAVIGNE	NICHOLS CONSULTANTS	VP OPS	ROBERT.LAVIGNE@NICHOLS-CT.COM
JON RUOBA	-DUDLEY	T.A.	JRoda@dudleyma.gov
STEVEN LAMARCA	DCRSD	SUPERVISOR	slamarca@dcrsd.org
Michelle Jervis	Town of Dudley	Admin. Sec. / BOS/TA	A Selectmen@dudleyma.gov
Venise Salwa	CMRPC	Planner	VSalwa@cmrpc.org
STEVE WOJNAN	Dudley Police	Chief of Police	Swojnan@dudleypolice.com
Ian McElwee	CMRPC		
Connor Rosewood	CMRPC		
Mimi Kaplan	CMRPC	Associate Planner	mkaplan@cmrpc.org



## Municipal Vulnerability Preparedness (MVP) Program Information



In September 2016, Governor Charlie Baker signed Executive Order 569, instructing state government to provide assistance to cities and towns in Massachusetts to complete climate change vulnerability assessments and resiliency planning.

The Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns to begin the process of planning for resiliency. The MVP program provides support for communities to address the challenges of climate change, and to prioritize climate adaptation practices actions at the local level in order to create a safer and more resilient future.

The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. MVP-certified providers across the state have been trained to provide technical assistance in completing the assessments and resiliency plan using the Community Resilience Building Framework. Municipalities work with a MVP-certified provider through a community-led process to identify key climate-related hazards, vulnerabilities and strengths, develop adaptation actions, and prioritize next steps.

The MVP Program is led by a Project Coordinator from the community with a Core Team of town staff and volunteers representing town planning departments, emergency managers, conservation commissioners, economic councils, the business community, and other key stakeholders who care about the future health and resilience of the community.

The MVP program helps communities to:

- Define extreme weather and natural and climate related hazards
- Identify existing and future vulnerabilities and strengths
- Develop and prioritize actions for the community
- Identify opportunities to build resiliency and reduce risk

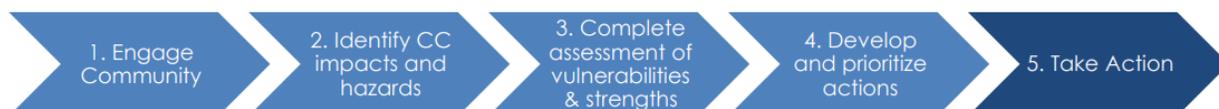
Results of the workshops and planning efforts will be incorporated into existing local plans, grant applications, budgets, and policies in order to ensure that resilience is a community priority. One area of focus will be using the findings to inform Master Plans, Hazard Mitigation Plans, Open Space Plans, and other comprehensive planning processes.

Upon successful completion of the program, communities will be designated as a “*Municipal Vulnerability Preparedness (MVP) Program Community*” and are eligible for MVP Action Grant funding and other opportunities.

**All MVP-certified communities will acquire priority status for follow-up state grant funding.**

**Flip page to learn more about MVP grant opportunities →**

**State and local partnership to build resiliency to climate change**





# **Municipal Vulnerability Preparedness (MVP)**

## Program Information



The MVP Program offers two grant programs for municipalities or groups of municipalities to either  
**1) conduct community resilience-building workshops and develop resiliency plans, OR**  
**2) for communities that have already completed the MVP process, to implement priority projects.**

### **MVP PLANNING GRANTS**

***To participate in the MVP program, communities first apply for Planning Grants, which are used to complete a community-based workshop and prioritize next steps to address climate change impacts.*** Applications may be for single communities or may be regional, with a single community serving as the fiscal agent. Municipalities with no current local hazard mitigation plan (HMP), or those with plans expiring in 2019 or 2020 are eligible for additional funding to complete or update a full draft of the HMP for MEMA review. Please note that an in-kind match is required for the MVP Planning Grant. All projects are required to provide quarterly reporting as well as a Final Report. All proposals must provide the following:

- A signed letter of support from the chair of the board of selectmen, mayor, a town administrator, or similar city or town official
- A short statement of the community's commitment to taking on this grant and planning for the impacts of climate change in the city or town
- The name of a qualified employee of the municipality, committee member or volunteer who can serve as the local project manager and point of contact for the grant
- A summary of community support and any project partners and letters of support from all relevant local boards, departments, commissions, businesses, organizations and other partners
- A description of any ongoing planning efforts such as local hazard mitigation plans, open space plans, master plans, etc.
- A description of the community's need to address climate change, expected impacts, and any ongoing climate-change related projects within the community or region
- If the community wishes to expand the scope of the planning grant provide a description of the additional work you intend to complete.

### **MVP ACTION GRANTS**

**Already a MVP Community? Apply for an Action Grant to implement priority projects identified at your community workshop and in your resiliency plan.** *MVP Action Grants are available only to designated "MVP Communities" to implement key priorities and projects identified through the MVP planning process.* The MVP Action Grants allow municipalities to implement crucial measures to prepare for the effects of climate change while strengthening community engagement and collaboration among town departments.

Applicants may request up to \$2,000,000 in funding and awards are expected to range from \$25,000–\$2,000,000. Regional proposals may request up to \$5,000,000. Note that exceptions may be made at EEA's discretion. These projects include follow-up vulnerability assessments, design studies, local bylaws and ordinances, redesigns and retrofits, natural infrastructure and storm protection, and education and outreach. Projects should be proactive, and applicants should clearly demonstrate how the projects have been redesigned, re-evaluated, or reconsidered to better respond to changing climate conditions and to incorporate new climate change data. Projects that propose nature-based solutions or strategies that rely on green infrastructure or conservation and enhancement of natural systems to improve community resilience will receive higher scores.

Please note that a 25% in-kind/cash match is required for the MVP Action Grant.

# Municipal Vulnerability Preparedness (MVP) Workshop: Dudley

## Reference Map: Table Map

### Legend

- Town Boundary
- Town Halls
- EOC
- Local Police
- State Police
- Fire Station
- Schools (Pre-K through High School)
- Dams**
- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- Major Road
- Local Road
- Active Service Railroads
- Water Bodies
- Streams
- MassDEP Wetlands
- High Slope (15% and above)
- FEMA National Flood Hazard Layer (DFIRM)**
- 100-year Flood Area
- 500-year Flood Area
- CIH (Points)**
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure
- Hazard

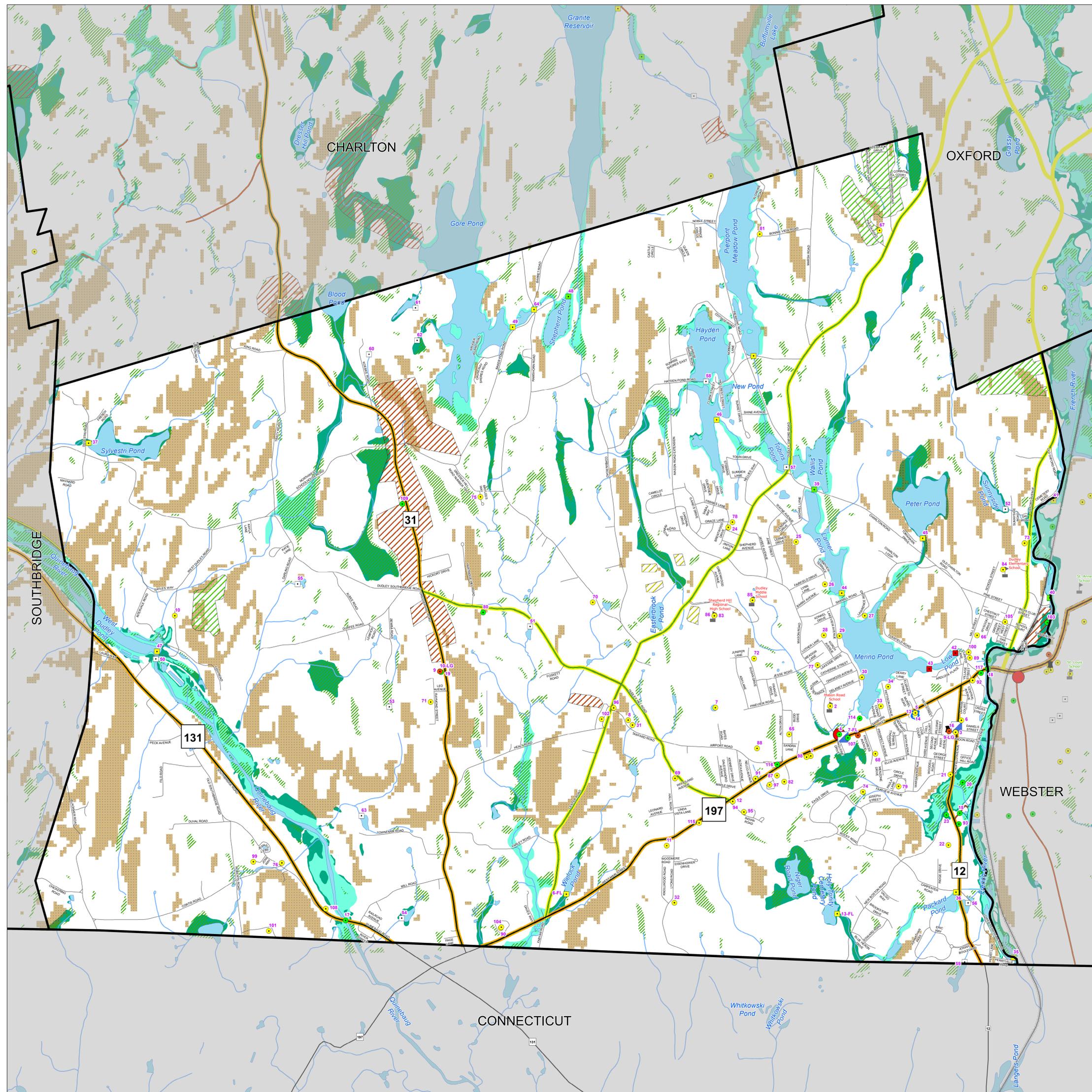


0 0.09).18 0.36 0.54 0.72 Miles



Flooding data source: FEMA's Digital Flood Insurance Rate maps(DFIRM). Other data sources include: MassGIS, MassDOT, and CMRPC. Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

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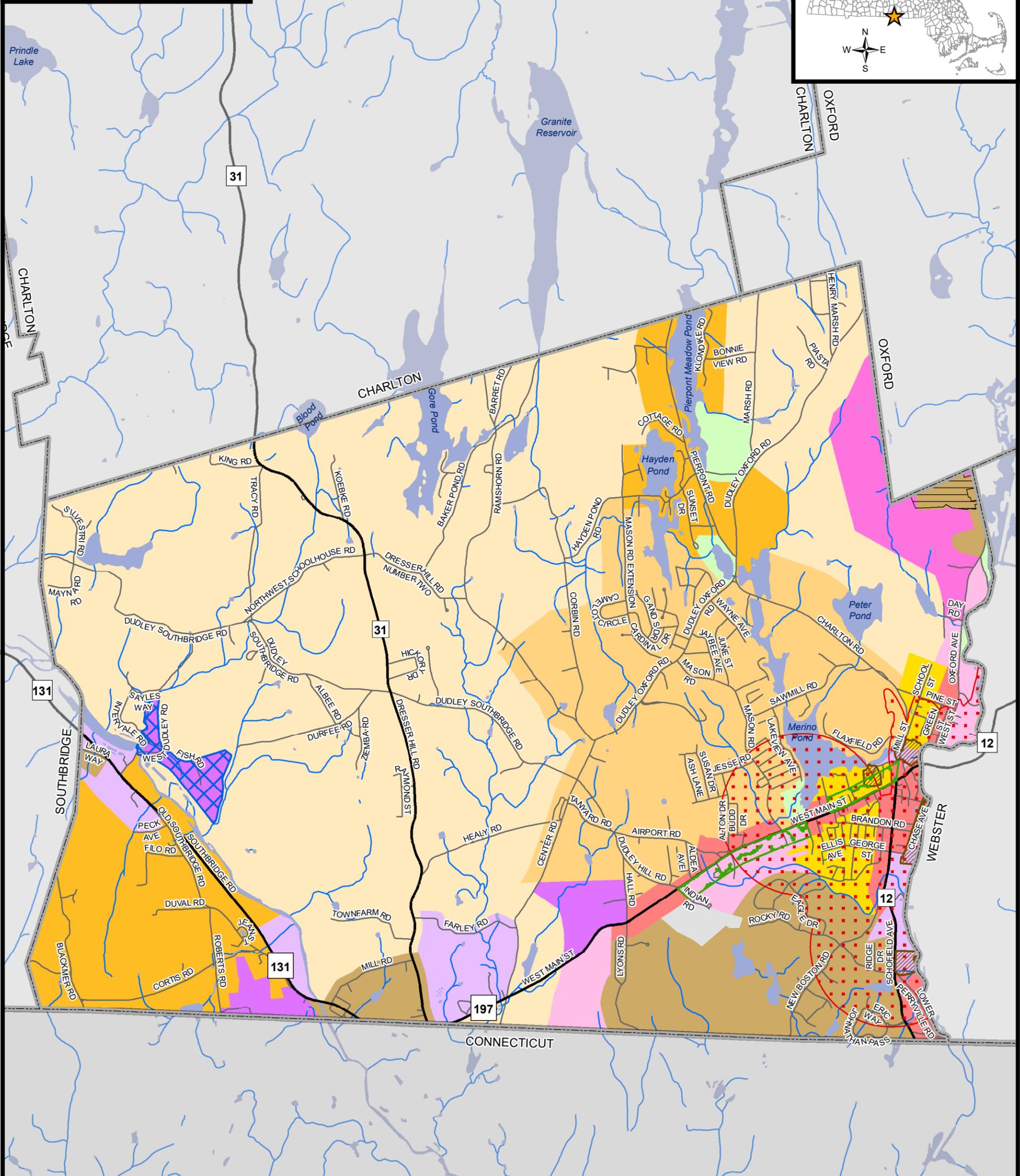
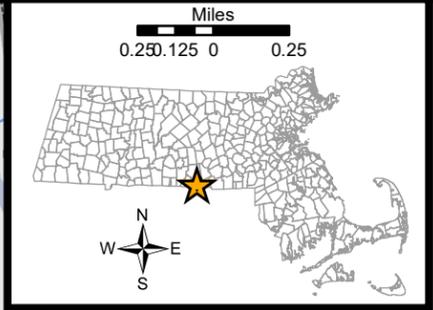


# Reference Map: Zoning

## Town of Dudley, Massachusetts

### Legend

- Town Boundary
- Major Road
- Water Bodies
- Local Road



Zoning District	Industry 43	Overlay Districts
General Residential	Industry 130	Solar
Residential 15	Light Industry 43	Adult Entertainment
Residential 30	Light Industry 87	Aquifer Protection
Residential 43	Town Refuse Disposal	Mill Conversion
Residential 87	Conservation	Business 15
Business / General Residential		

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

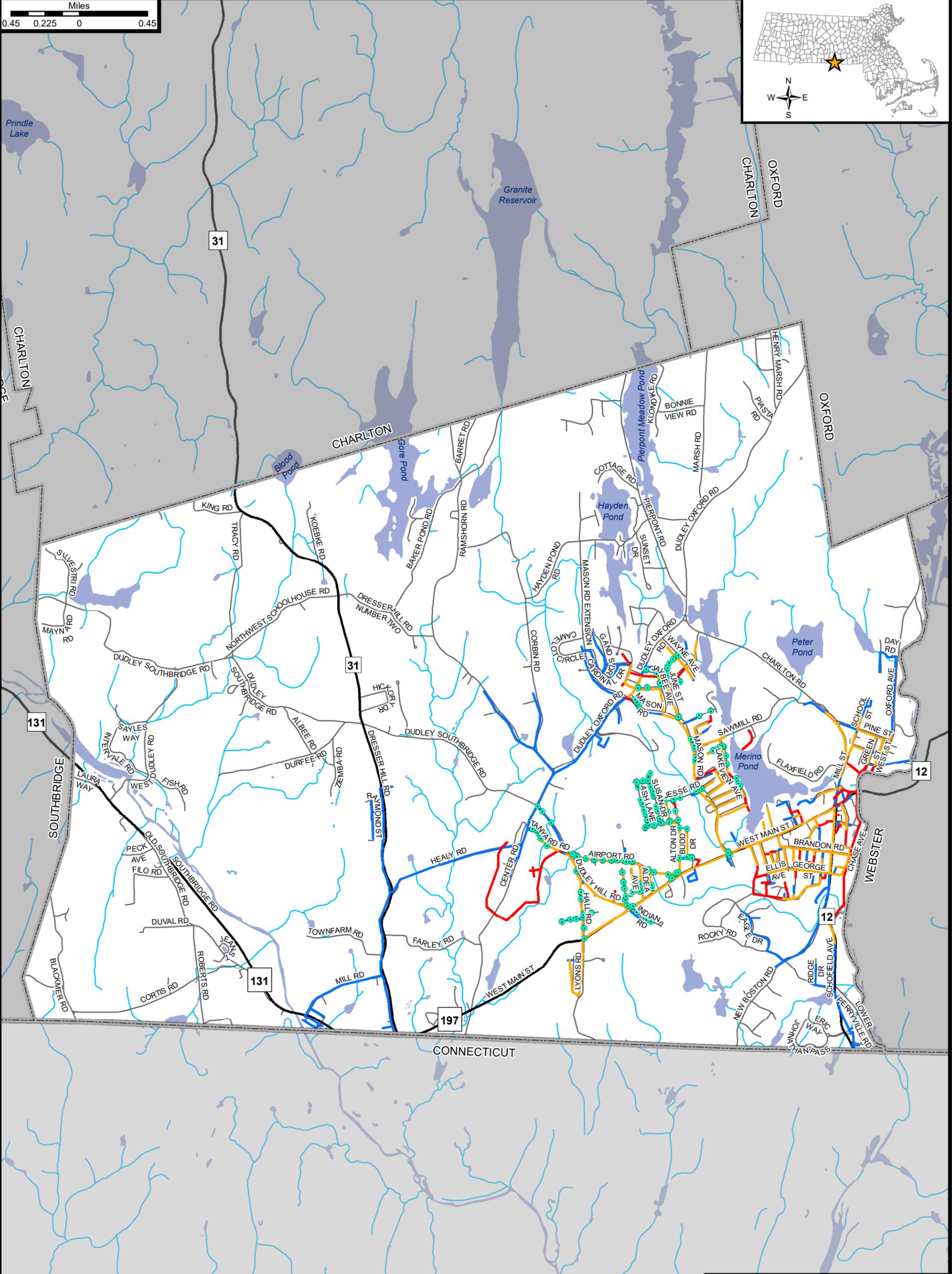
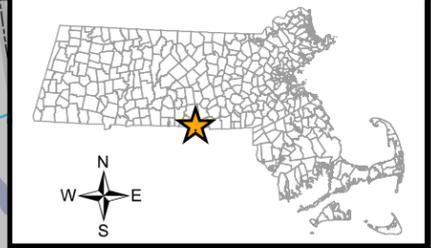
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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Utility Infrastructure

## Town of Dudley, Massachusetts



**Legend**

- Town Boundary
- Major Road
- Stormwater Inlets
- Water Bodies
- Local Road
- Sewer Line
- Water Line
- Water/Sewer

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

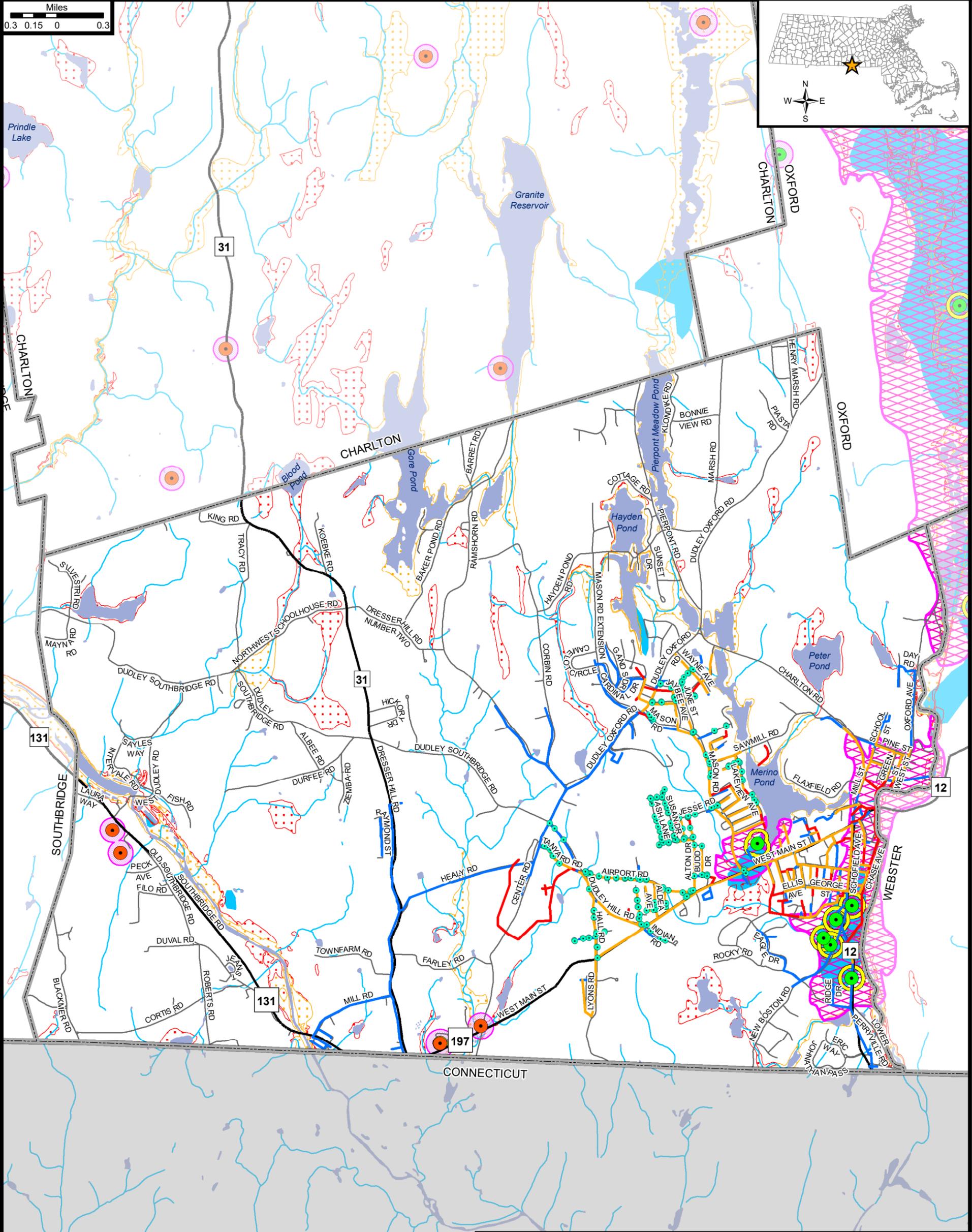
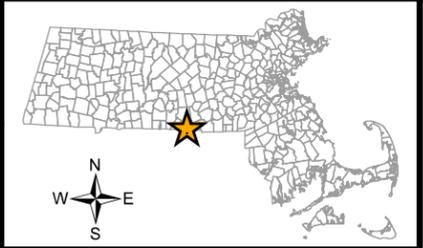
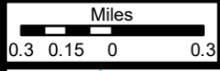


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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Water Resources

## Town of Dudley, Massachusetts



Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

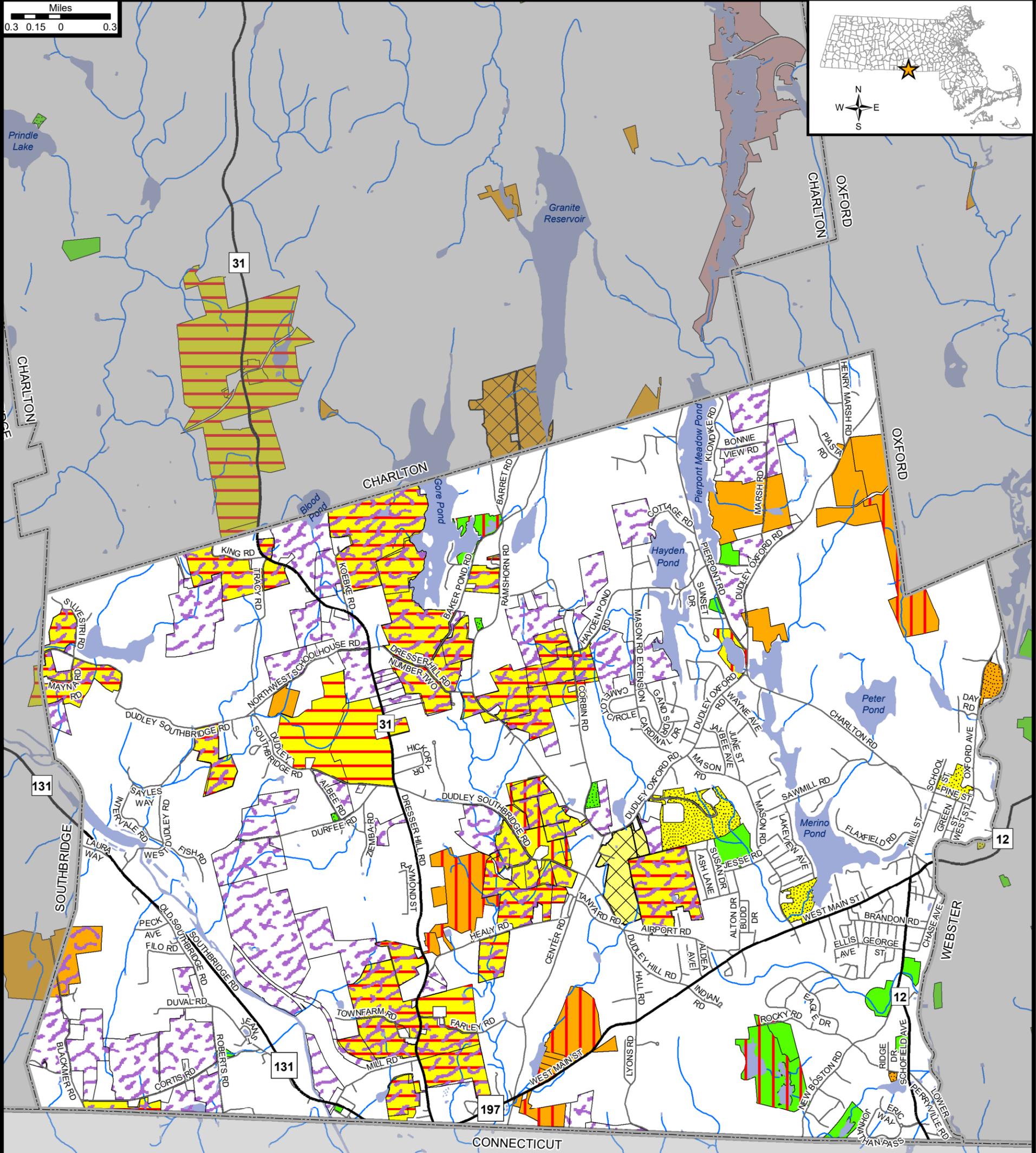
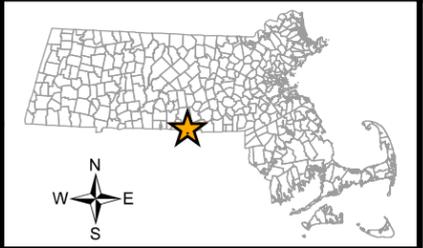
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<ul style="list-style-type: none"> <li>Community Groundwater Source</li> <li>Surface Water Intake</li> <li>Non-Community Groundwater Source</li> <li>Emergency Surface Water</li> </ul>	<ul style="list-style-type: none"> <li>DEP Approved Zone I Approved Wellhead Protection Areas (Zone II)</li> <li>Interim Wellhead Protection Areas</li> <li>Aquifer</li> </ul>	<ul style="list-style-type: none"> <li>FEMA National Flood Hazard Layer (DFIRM Data) or FEMA Q3 Flood Zones (Pre-DFIRM)</li> <li>100-year Flood Area</li> <li>500-year Flood Area</li> <li>Stormwater Inlets</li> </ul>	<ul style="list-style-type: none"> <li>Surface Water Supply Protection Area</li> <li>Zone A</li> <li>Zone B</li> <li>Zone C</li> <li>Sewer Line</li> <li>Water Line</li> <li>Water/Sewer</li> </ul>
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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Open Space

## Town of Dudley, Massachusetts



**Legend**

- Town Boundary
- Water Bodies
- Open Space Categories
- Open Space Ownership
- Level of Protection
- Major Road
- Local Road
- Federal
- State
- Municipal
- Private
- Non-Profit
- Agricultural Preservation Restriction
- Conservation Restriction
- Perpetuity\*
- Limited
- None
- Chapter Land (61, 61A, 61B)

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

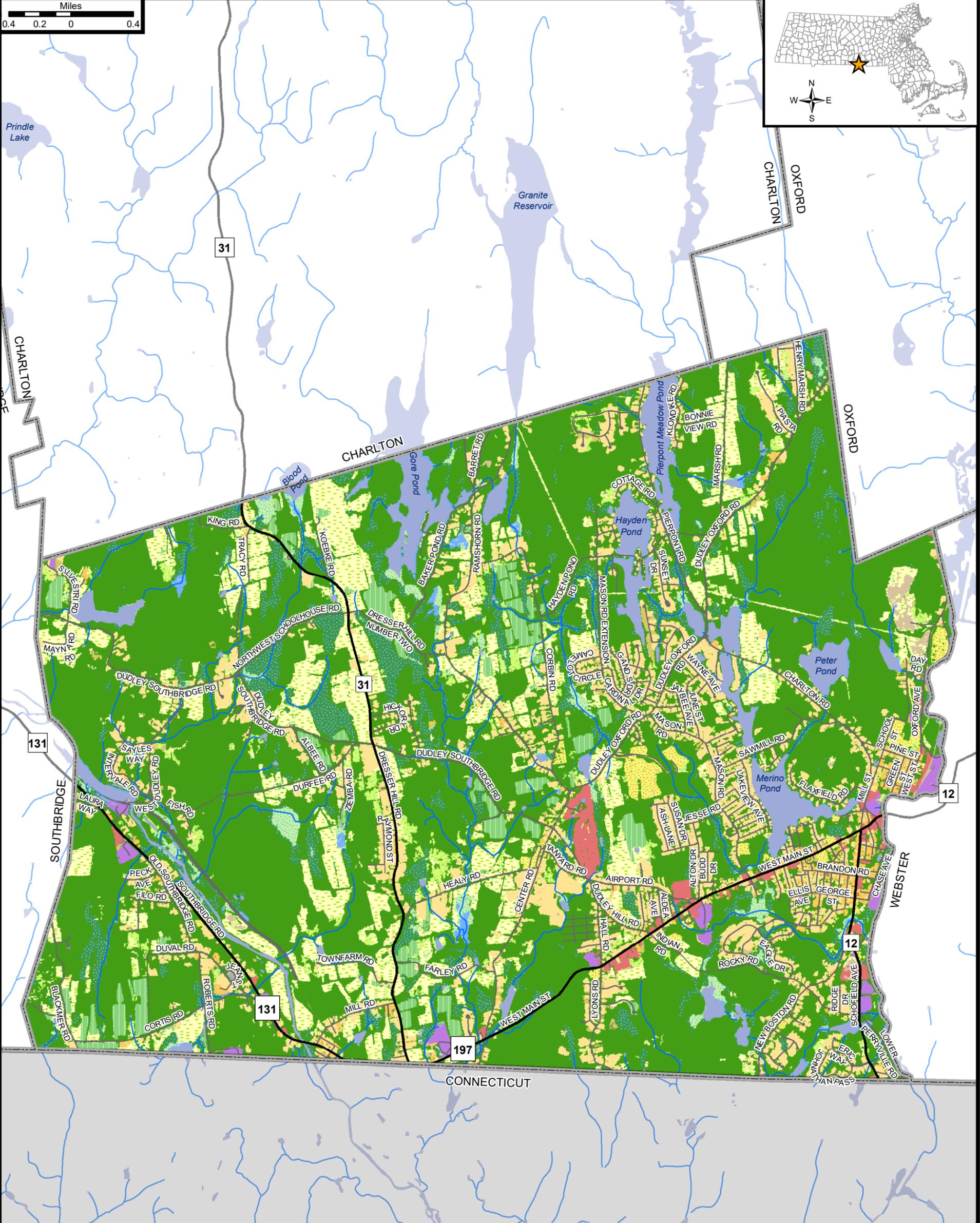
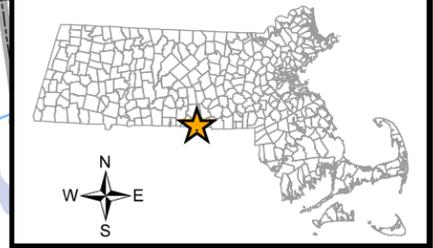


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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Land Use (2016)

## Town of Dudley, Massachusetts



Land Use			
	Residential		Forested Wetland
	Residential - Multi-Family		Non-forested Wetland
	Commercial		Forest
	Industrial		Scrub/Shrub
	Mixed Use - Other		Bare Land
	Urban Public/Instit...		Saltwater Wetland
	Pasture/Hay		Water
	Cultivated		Unconsolidated Shore
	Forest		Aquatic Bed
	Scrub/Shrub		Other Impervious
	Bare Land		Developed Open Space
	Right-of-way		Cranberry bog
	Cranberry bog		Orchard
	Orchard		Nursery
	Nursery		Misc
	Misc		

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS and the Massachusetts Audubon Society.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

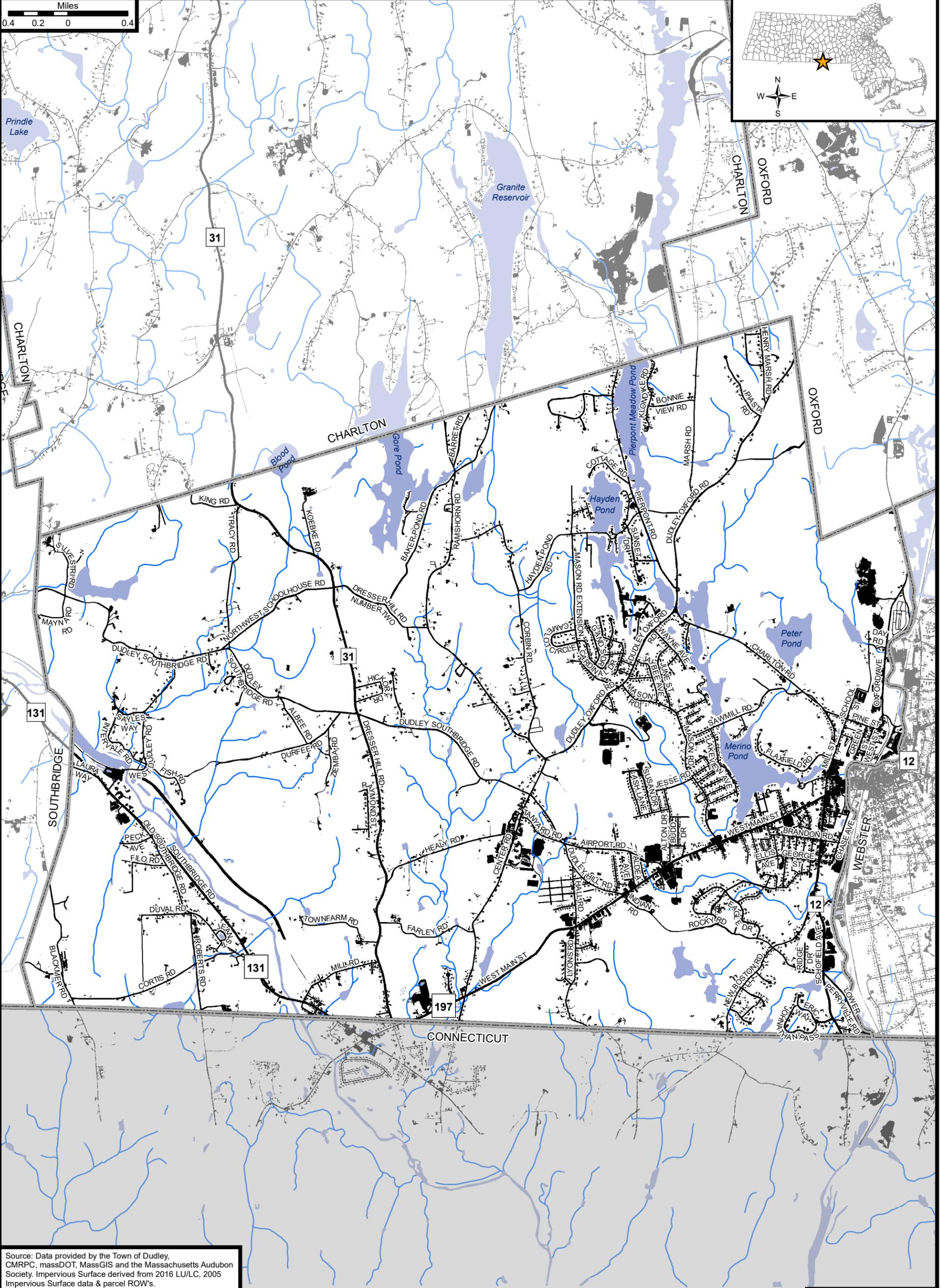
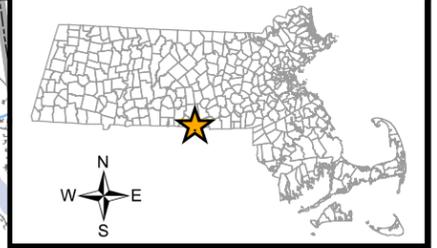
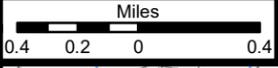


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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Impervious Surface

## Town of Dudley, Massachusetts



Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS and the Massachusetts Audubon Society. Impervious Surface derived from 2016 LU/LC, 2005 Impervious Surface data & parcel ROW's. Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.



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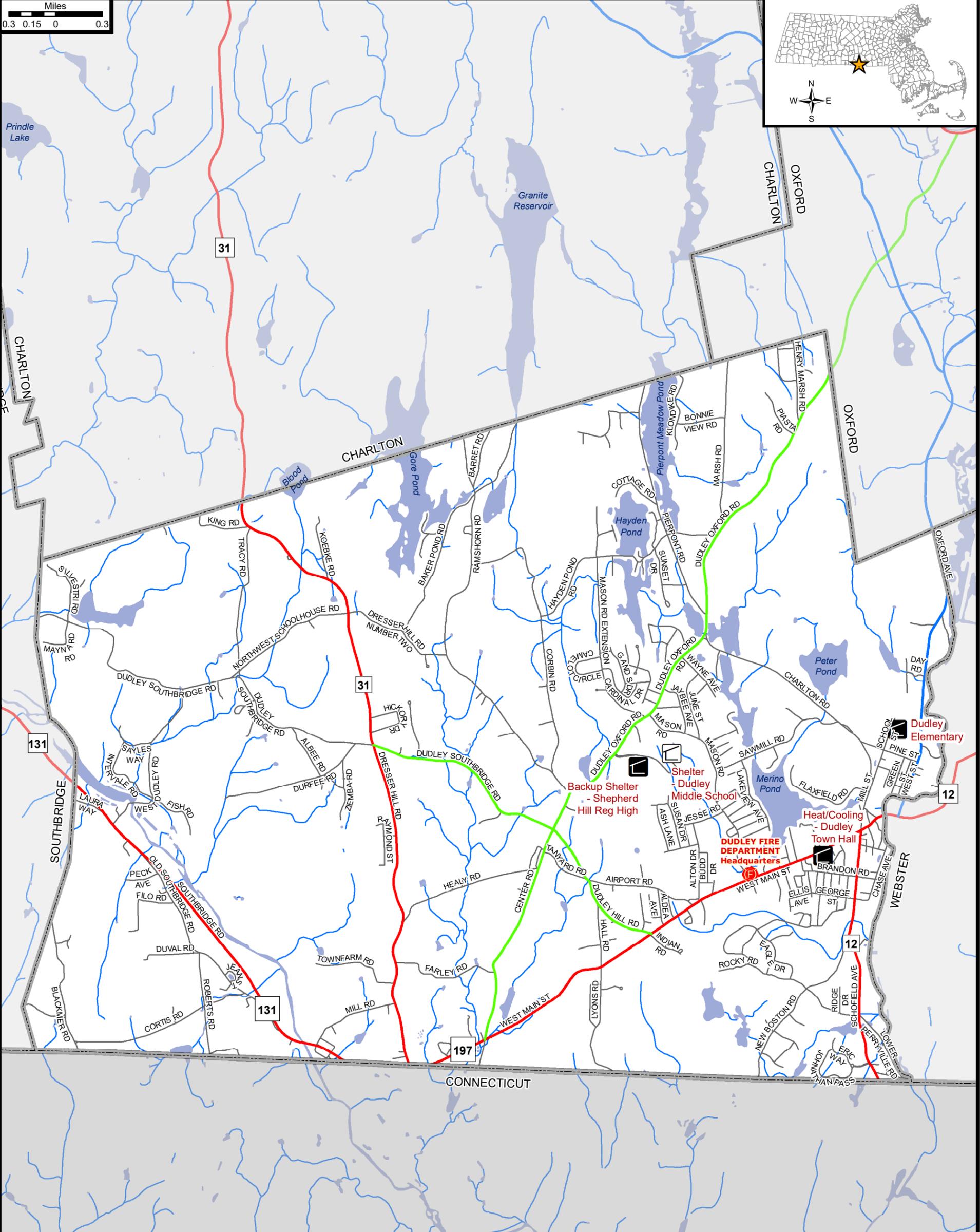
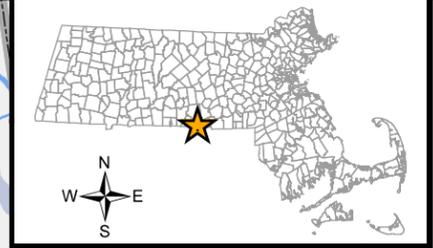
**Legend**

- Impervious Surface

# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Evacuation Routes & Shelters

## Town of Dudley, Massachusetts



**Legend**

- Town Boundary
- Major Road
- Water Bodies
- Local Road
- Shelter
- Locally Identified Shelter

**Evacuation Routes**

- Highway
- Secondary
- Primary
- Tertiary

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

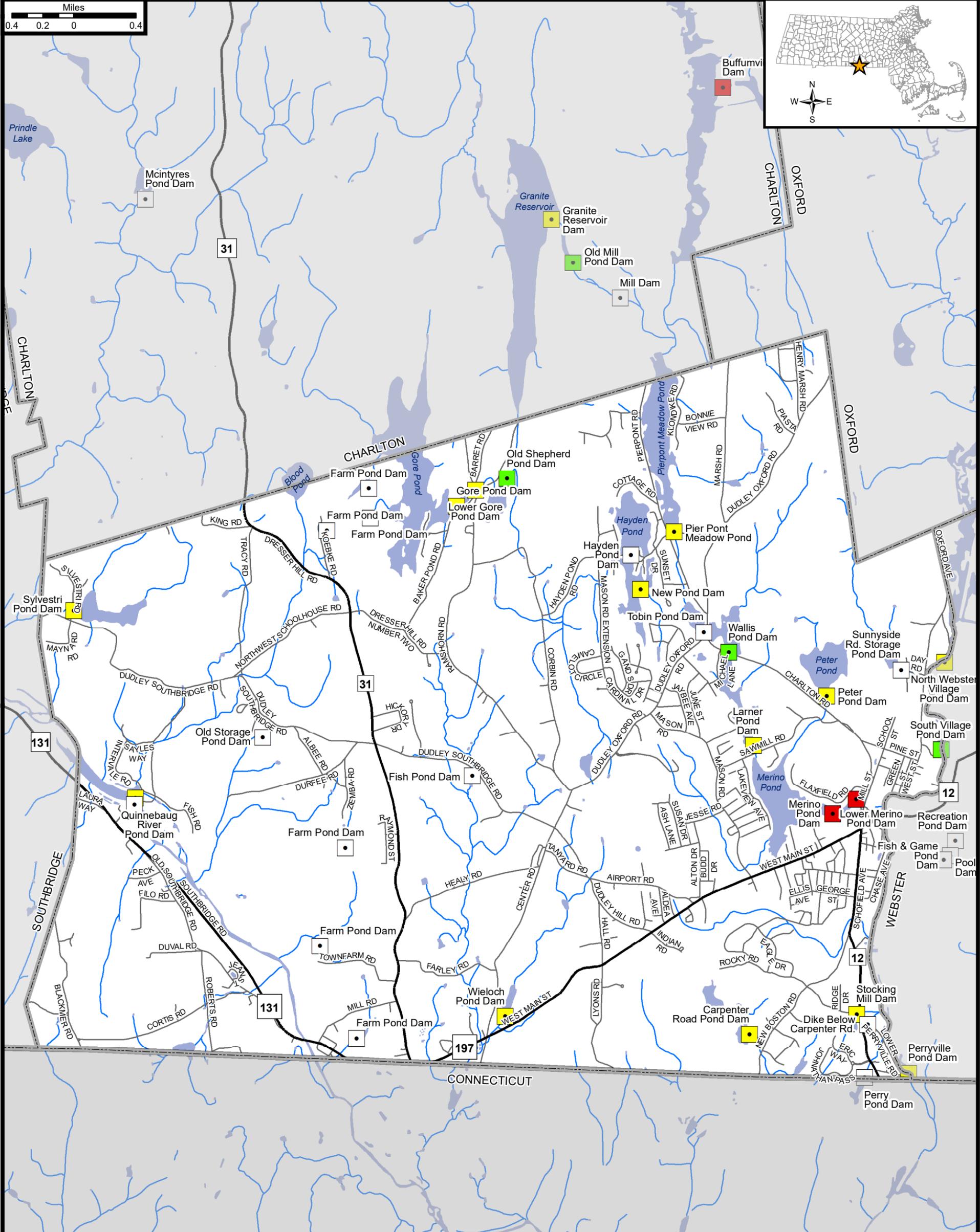
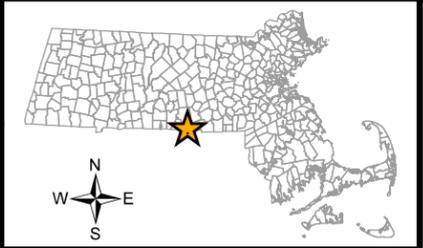
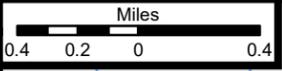


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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Dams

## Town of Dudley, Massachusetts



**Legend**

- Town Boundary
- Major Road
- Water Bodies
- Local Road

**Dams**

- High Hazard
- Low Hazard
- Significant Hazard
- Not Rated, Too Small

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

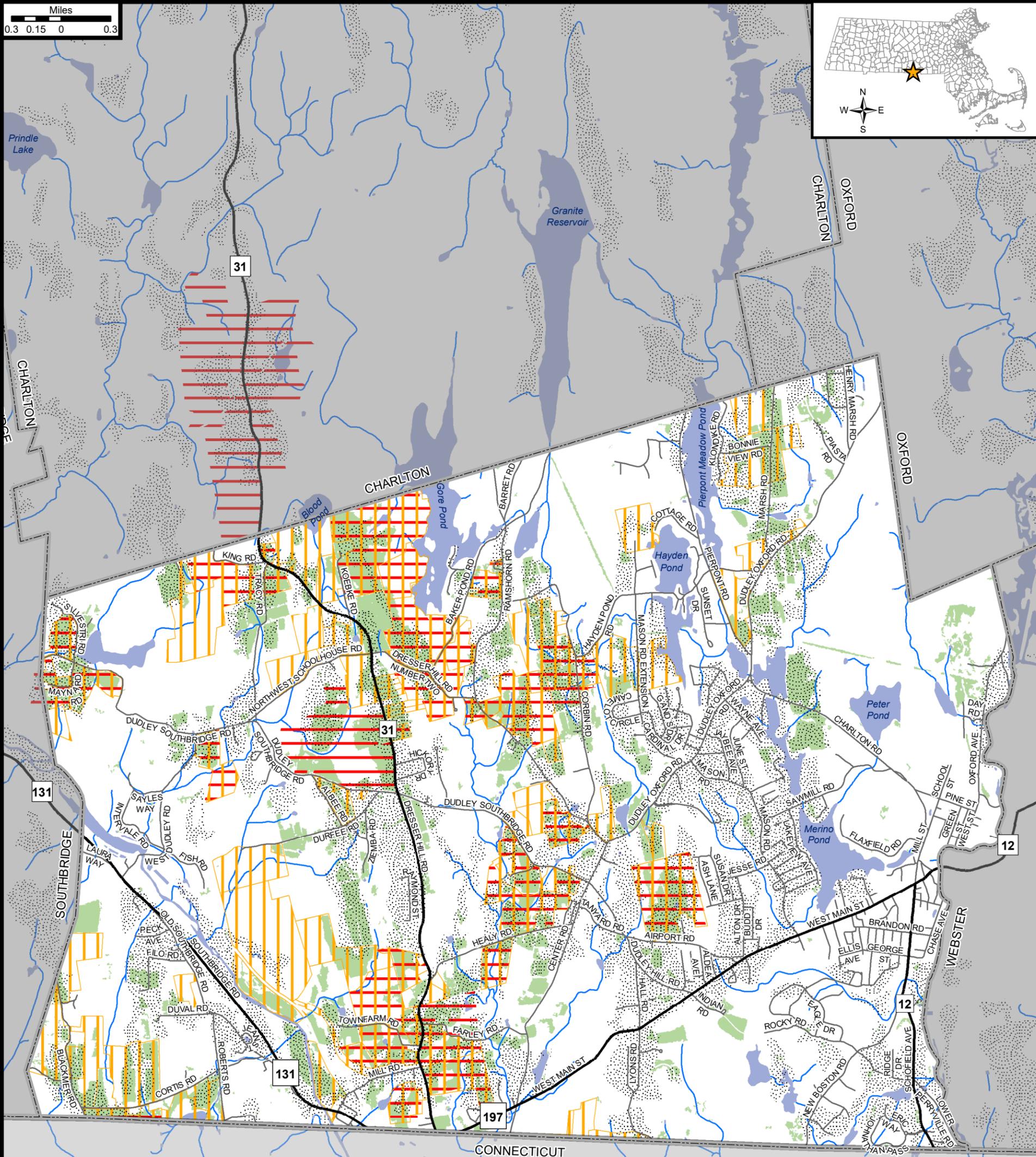
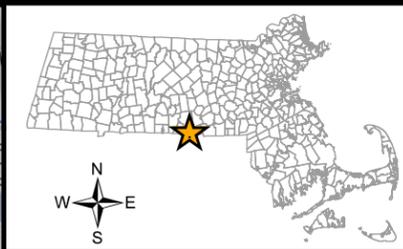


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# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Agriculture

## Town of Dudley, Massachusetts



Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

One Mercantile Street, Suite 520 - Worcester, MA 01608

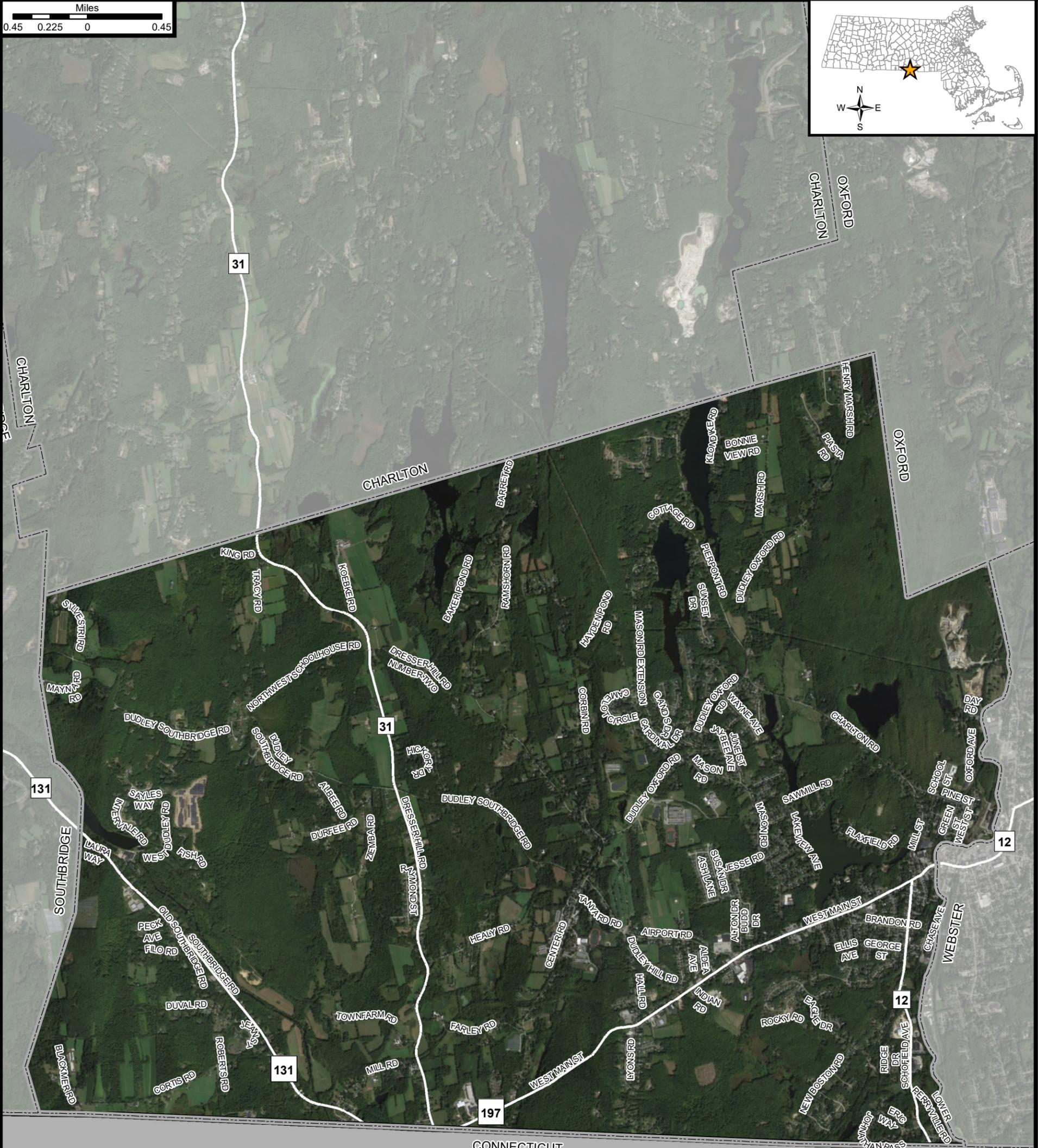
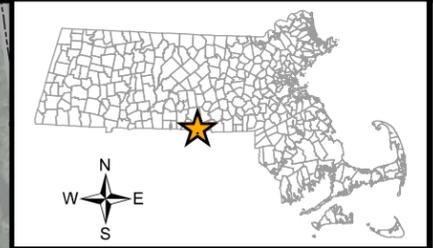
**LEGEND**

	Town Boundary		Major Road
	Water Bodies		Local Road
	Prime Farmland		Chapter 61A Land
	Agricultural Preservation Restriction		Agricultural Land (2016 LC/LU)

# Municipal Vulnerability Preparedness (MVP) Workshop

# Reference Map: Orthophoto (2017)

## Town of Dudley, Massachusetts



Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS, Imagery (C) Google.

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One Mercantile Street, Suite 520 - Worcester, MA 01608

# Municipal Vulnerability Preparedness (MVP) Workshop

# Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

## Dudley Table 1

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.)

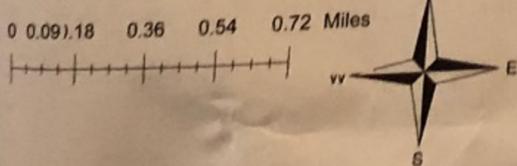
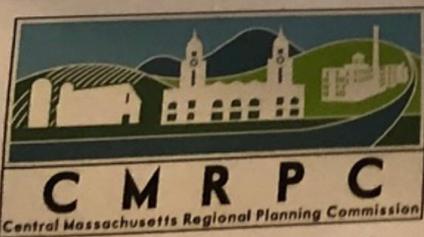
Features	Location	Ownership	V or S	Floods	Wind Events	Winter Storms	Extreme Temperatures	Priority	Time
								H - M - L	Short Long Ongoing
<b>Infrastructural</b>									
Dams	Merino, Lower Merino, Carpenter Rd.	Town	V	Dam Assessment - Remove vs. Repair				H	O
West Main St. Drainage	West Main St. @ Marry's	State	V	Improved with fire station drainage but need to engineer pipe in front of post office to further improve drainage				H	O
Town Hall - Redunant Systems I.T	71 West Main St.	State	V	Purchase + install equipment training system				M	O
Indian Rd. - One Access	Indian Rd. highway and Shelt.	Town	V	Engineer + construct second access				M	L
Water - Sewer Piples + Wells + Tanks	Water/ sewer grid - multiple locations	Town	V	Engineer, repair, replace, add more				H	O
SHRHS One/ Middle School Access	Dudley/ Oxford Rd.	Town	V	Engineer + construct second access				H	L
Communications - Copper to Fiber	Townwide	Town	V	Change copper wire to fiber - line, upgrade equipment				H	L
Town Wide Drainage	All encompassing	Town	V	Engineer, repair, replace				H	O
Road/ St. Improvements	Townwide	Town	V	Engineer, repair, replace				H	O
8 Mill St. - Mill Water Aquifer	Private	Town	V	Work with contractors to get building occupied + up to code				H	L
<b>Societal</b>									
Senior Housing Upgrade	Joshua Place	Town	V	Shelter upgrade - sustainable food + water (MRE), alternative power source				H	L
Elderly Programs - Tri Valley	Mill St.	Town/ Private	S	Social media - advertise more				L	O
CERT Team / Tri Epic	Townwide	Town	S	More regional training, utilize more - non-emergency event?				L	O
RAVE System	Townwide	Town	S	Maximize number of persons subscribed				L	O
Nichols radio (97.5)	Townwide	Private	S	Advertise better - social media, mail out with taxes, town paper				L	O
Bylaws/ Stormwater Management	Townwide	Town	S	Working document - keep updated - public education				L	O
Mosquitos - Insect Bourne Viruses	All encompassing	Town	V	Early warning, public awareness, research coalitions, environmental safety, training education				H	O
<b>Environmental</b>									
Mosquitos - Insect Bourne Viruses	All encompassing	Town	V	Early warning, public awareness, research coalitions, environmental safety, training education				H	O
Fire Station Drainage	128 West Main St.	Town	S	Upkeep - keep operational + efficient				L	O
Shields Packaging	50 Oxford Ave.	Private	V	Education + training, environmental impacts, work with ownership to keep safe + up to code				H	L

# Municipal Vulnerability Preparedness (MVP) Workshop: Dudley

Reference Map:  
Table Map  
# 1

## Legend

- Town Boundary
- Town Halls
- EOC
- Local Police
- State Police
- Fire Station
- Schools (Pre-K through High School)
- Dams**
- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- Major Road
- Local Road
- Active Service Railroads
- Water Bodies
- Streams
- MassDEP Wetlands
- High Slope (15% and above)
- FEMA National Flood Hazard Layer (DFIRM)**
- 100-year Flood Area
- 500-year Flood Area
- CIH (Points)**
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure
- Hazard



Flooding data source: FEMA's Digital Flood Insurance Rate maps (DFIRM) and CMRPC.

TABLE # 1

TABLE # 1

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, heat wave, etc.)

Features	Location	Ownership	V or S	FLOODS	WIND EVENTS	Winter STORMS	Extreme TEMPS.	Priority		Vote
								H-M-L	Short Long Ongoing	
Infrastructural										
DAMS	Merino, Lower-Merino, Carpenter	TOWN	V	Dam ASSESEMENT - REMOVE V. REPAIR				H	O	
WEST MAIN ST. Drainage	WEST MAIN ST. @ MARRY'S	STATE	V	IMPROVED with FIRE STATION Drainage but need to Engineer PIPE IN FRONT OF POST OFFICE to further improve Drainage.				H	O	
TOUIN HALL - REDUNANT Systems I.T.	WEST MAIN ST.	TOWN	V	PURCHASE + INSTALL Equipment TRAINING System				M	O	
INDIAN RD. - ONE ACCESS	INDIAN RD. Highway An. Shelt.	TOWN	V	Engineer + Construct SECOND ACCESS				M	L	
WATER / SEWER Pipes ONE	WATER / SEWER GRID	TOWN	V	Engineer, Repair, REPLACE				H	O	
WATER - WELLS + TANK	Multiple Locations	TOWN	V	Engineer, REPLACE, ADD MORE				H	O	
SHRHS / MIDDLE SCHOOL ONE ACCESS	DUDLEY / OXFORD RD.	TOWN	V	Engineer + Construct SECOND ACCESS				H	L	
COMMUNICATIONS - COPPER to FIBER	TOWNWIDE	TOWN	V	CHANGE Copper wire to FIBER - LINE upgrade Equipment				H	L	
TOWNWIDE Drainage	All encompassing	TOWN	V	Engineer, Repair, REPLACE				H	O	
ROAD / ST. IMPROVEMENTS	TOWNWIDE	TOWN	V	Engineer, Repair, REPLACE				H	O	
Societal										
Senior Housing, upgrade	JOSHUA PLACE	TOWN	V	Sustainable Food + WATER (MRE) SHELTER UPGRADE, ALTERNATIVE Power Source				H	L	
Elderly Programs - Tri Valley	MILL ST.	TOWN / PRIVATE	S	Social MEDIA -> ADVERTISE MORE				L	O	
CERT TEAM / TRI-ERIC	TOWNWIDE	TOWN	S	MORE REGIONAL TRAINING, USE MORE NON-EMERGENCY EVENTS?				L	O	
RAVE SYSTEM	TOWNWIDE	TOWN	S	MAXIMIZE number of Persons subscribed Social MEDIA				L	O	
NICHOLS RADIO (97.5)	TOWNWIDE	PRIVATE	S	ADVERTISE BETTER -> MAIL OUT with TAXES PUBLIC EDUCATION				L	O	
Bi-LAWS / STORMWATER Mgmt.	TOWNWIDE	TOWN	S	Working Document - KEEP UPDATED - EDUCATION				L	O	
"	"	"	"	"	"	"	"	"	"	
Environmental										
Mosquitoes - INSECT Bourne viruses	All encompassing	TOWN	V	EARTH WARNING Public AWARENESS, RESEARCH COALITIONS, Environmental TRAINING SAFETY, EDUCATION				H	O	
8 mill ST. - MISC WATER Aquifer	Private -> 8 mill St.		V	Work with Contractors to Get Building occupied + up to code				H	L	
FIRE STATION Drainage	128 WEST MAIN ST.	TOWN	S	UP KEEP -> KEEP OPERATIONAL + efficient				L	O	
SHIELDS Packaging	50 OXFORD AVE.	PRIVATE	V	EDUCATION + TRAINING Environmental work with ownership Impacts, to keep safe + up to code				H	L	

# Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

## Dudley Table 2

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.)

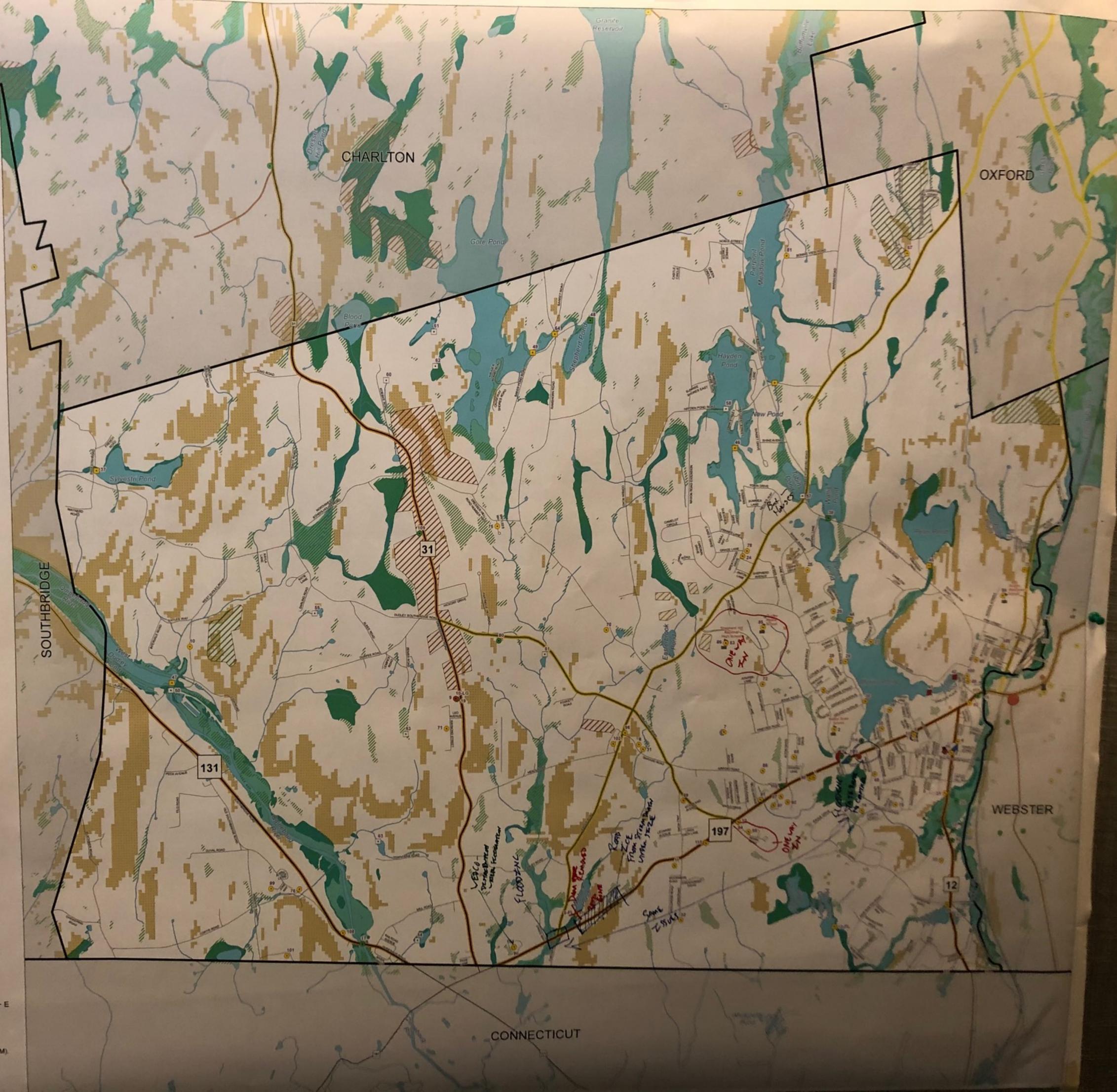
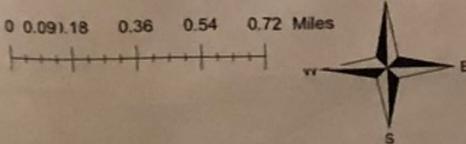
Features	Location	Ownership	V or S	Flooding	Wind Events	Winter Storms	Extreme Temperatures	Priority	Time
								H - M - L	Short Long Ongoing
<b>Infrastructural</b>									
Electrical/ Utilities	Townwide	Private	B (both)	Alternative energy sources for - key utilities, institutions, build stronger relations with utility - remove + replacement of trees				H	O
Water System - public water system, community, private wells	Townwide	Public/ Private	B (both)	Ensure backup power to town wells, promote stronger water conservation in new construction, look for new water source?				M	L
Gas - limited extent	Limited	Private	B (both)	Increase capacity, extend gas lines				M	L
Roadways - state roads, lack of action, heavy rain - temp. flooding		State/ Town	B (both)	Intersection of 197 + center road + 197/ Prospect Ave., flooding on state road affects public safety - work with DOT to place on tip				H	S
Dams - potential failure	Townwide	Public/ Private	B (both)	10 town owned dams, analyze + prioritize replace/removal of most deficient dams				H	O
Webco + Business Community	420. West Main St.	Private	S	Continuity of operations during events				M	O
Hospitals	Webster/ Southbridge	Private	S	Have good access to hospitals					
Stormwater (MS4)	Townwide	Public	B (both)	See roadways					
Recycle Center/ DPW/ Old Pump	Indian Rd.	Public	B (both)	Need second egress				M	L
<b>Societal</b>									
ELBC/ WTIL (tree trimming)	Townwide	Private	B (both)	Dependent on utility to clean up. Important to trim trees overhead + need to be more aggressive				H	O
Communications (RAVE, cell coverage, public safety departments)	Townwide	Private	B (both)	Upgrade wiring to fiber for public safety across the town away from lines				M	L
Elderly Housing/ Senior Center - Joshua Place + others		Public/ Private	B (both)	Ensure transportation + communication to shelter; provide info to seniors for outages				M	O
Children, Schools	Townwide		S	Need second egress at regional H.S + Dudley Middle School				M	L
Immigrant population - non-English schools held to integrate				Community liason to non-English population. Ensure resources to school. Share resources with Webster + Southbridge - connect to public library				M	O
Parks + Recreation - skating, rail trail	Townwide		S						
Nichols College	Center Rd.	Private	B (both)	Good communication with the town. Share emergency communication, develop alternative energy + storogae; shelter in place				M	S
Boys and Girls Club			S						
<b>Environmental</b>									
Town Well Water Quality	Townwide	Public/ Private	B (both)						
Impact on Farms				Study reforestation to maintain future agriculture use. Trees increase resiliency				L	L
Invasive Species - choking ponds (Tobens Pond)	Townwide	????	V	Increase communication + awareness				H	O
Wetlands/ Natural Flood Plains	Townwide								
EEE - threat increasing with warmer temperatures	Townwide	????	V	Consider joining regional mosquito control, bat houses				H	O
Forest	Townwide			Debris management				M	O

Street Trees				Guidelines fore tree planting to minimize future costs, need increased funding for tree maintenance	M	O
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# Municipal Vulnerability Preparedness (MVP) Workshop: Dudley

Reference Map:  
Table Map  
#2

- Legend**
- Town Boundary
  - Town Halls
  - EOC
  - Local Police
  - State Police
  - Fire Station
  - Schools (Pre-K through High School)
  - Dams**
    - High Hazard
    - Significant Hazard
    - Low Hazard
    - N/A
  - Major Road
  - Local Road
  - Active Service Railroads
  - Water Bodies
  - Streams
  - MassDEP Wetlands
  - High Slope (15% and above)
  - FEMA National Flood Hazard Layer (DFIRM)**
    - 100-year Flood Area
    - 500-year Flood Area
  - CIH (Points)**
    - Vulnerable Critical Infrastructure
    - Non-vulnerable Critical Infrastructure
    - Hazard
  - Vulnerable Critical Infrastructure
  - Hazard
  - Vulnerable Critical Infrastructure
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  - Hazard



Flooding data source: FEMA's Digital Flood Insurance Rate maps (DFIRM). Other data sources include: MassGIS, MassDOT, and CMRPC. Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution.

Community Resilience Building Risk Matrix

TABLE # 2

www.CommunityResilienceBuilding.org

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, heat wave, etc.)

Features	Location	Ownership	V or S	FLOODING	WIND EVENTS	WINTER STORMS	EXTREME TEMPS	Priority	Time	Vote
								H-M-L	Short Long Ongoing	
<b>Infrastructural</b>										
ELECTRICAL / UTILITIES	TOWN WIDE	PRIVATE	V + S	ALT. ENERGY SOURCES FOR KEY UTILITIES + INSTITUTIONS BUILD STRONGER RELATIONS W/ UTILITY - REMOVAL + REPLACEMENT OF TREES						
WATER SYSTEM (PUBLIC WATER SYSTEM, COMMUNITY " " PRIVATE WELLS)	TOWN WIDE	PUBLIC + PRIVATE	V/S	INSURE BACK-UP POWER TO TOWN WELLS PROMOTE STRONGER WATER CONSERVATION IN NEW CONSTRUCTION LOOK FOR NEW WATER SOURCE?				H	O	
GAS - LIMITED EXTENT	LIMITED	PRIVATE	V/S	INCREASE CAPACITY, EXTEND GAS LINES				M	L	●
ROADWAYS (STATE ROAD - LACK OF ACTN, HEAVY RAIN - TEMP. FLOODING)		STATE + TOWN	V/S	INTERSEC. OF 177 + CENTER ROAD + 177/PROSPECT AVE. FLOODING ON STATE ROAD AFFECTS PUBLIC SAFETY - WORK WITH DOT TO PLACE ON TIP				M	L	
DAMS - POTENTIAL FAILURE	TOWN WIDE	PUBLIC + PRIV	V/S	10 TOWN-OWNED DAMS; ANALYZE + PRIORITIZE REPAIR/REMOVAL OF MOST DEFICIENT DAMS				H	S	● ●
WEBCO + BUSINESS (COMMUNITY)	420 W. MAIN	PRIVATE	S	CONTINUITY OF OPERATIONS DURING EVENTS				H	O	● ● ● ●
HOSPITALS (WEBSTER, SOUTHRIDGE)	WEBSTER, SOUTHRIDGE	PRIVATE	S	HAVE GOOD ACCESS TO HOSPITALS				M	O	
STORM WATER (MSH)	TOWN WIDE	PUBLIC	V/S	SEE ROADWAYS				M		● ● ●
RECYCLE CENTER / DRY / OLD PUMP	INDEAN RD.	PUBLIC	V/S	NEED SECOND EGRESS				M	L	
<b>Societal</b>										
ELRC / UTIL (TREE TRIMMING)	TOWN WIDE	PRIVATE	S/V	DEPENDENT ON UTILITY TO CLEAN UP. IMPORTANT TO TRIM TREES OVERHEAD + AWAY FROM LINES NEED TO BE MORE AGGRESSIVE				H	O	
COMMUNICATIONS (RAV, CELL COVERAGE, PUBLIC SAFETY DEPTS)	TOWN WIDE	PRIVATE	S/V	UPGRADE WIRING TO FIBER FOR PUBLIC SAFETY ACROSS THE TOWN				M	L	
ELDERLY HOUSING - ESHUT PLACE + OTHERS			V/S	INSURE TRANSPORTATION TO SHELTERED; PROVIDE INFO TO SENIORS FOR OUTAGES + COMMUNICATION				M	O	●
CHILDREN, SCHOOLS	TOWN WIDE		S	NEED SECOND EGRESS AT REGIONAL H.S. + DUDLEY MID SCH				M	L	
IMMIGRANT POPULATION - NON-ENGLISH (SCHOOLS HARD TO INTEGRATE)				COMMUNITY LIAISON TO NON-ENGLISH POP. INSURE RESOURCES TO SCHOOL SHARE RESOURCES WITH WEBSTER + SOUTHRIDGE CONNECT TO PUBLIC LIBRARY				M	O	
PARKS + REC - SKATING, RAILTRAIL	TOWN WIDE		S							
NICHOLS COLLEGE	CENTER RD.	PRIVATE	S/V	GOOD COMMUNICATION WITH THE TOWN. SHARE EMERGENCY COMMUNICATION DEVELOP ALTERNATIVE ENERGY + STORAGE; SHELTER IN PLACE				M	S	
SENIOR CENTER		PUBLIC	S	SEE ELDERLY HOUSING						
LIBRARY		PUBLIC	S							
BOY + GIRLS CLUB			S							
<b>Environmental</b>										
TOWN WELLS WATER QUALITY	TOWN WIDE	PUBLIC PRIVATE	S/V							
IMPACT ON FARMS				STUDY REFORESTATION TO MAINTAIN FUTURE AG USE. TREES INCREASE RESILIENCY				L	L	●
INVASIVE SPECIES (CHOKING PONDS, TOWN POND)	TOWN WIDE	???	V	INCREASE COMMUNICATION + AWARENESS				H	O	●
WETLANDS / NATURAL FLOOD PLAINS	TOWN WIDE									
EFE - THREAT INCREASING - WARMER	TOWN WIDE	???	V	CONSIDER JOINING REGIONAL MOSQUITO CONTROL BAT HOUSES DEBRIS MANAGEMENT				H	O	●
FOREST								M	O	
FRESH LAND				GUIDELINES FOR TREE PLANTING TO MINIMIZE FUTURE COSTS NEED INCREASED FUNDING FOR TREE MAINTENANCE				M	O	
STREET TREES										

Other # 2

DAMS - MERINO, LOWER MERINO,  
CARPENTER RD, FLOODING / DAM  
FAILURE

WEST MAIN ST. / MARTY'S (FLOODING)

→ DRAINAGE ISSUE

TOWN HALL / P.D. → REDUNDANT SYSTEMS /  
I.T. / COMMUNICATION

→ STORMS - ANY - EXTENDED EVENT

INDIAN ROAD ACCESS → (STORMS - WIND  
EVENTS)

MOSQUITOES - INSECT BOURNE VIRUSES  
(EXTREME TEMPERATURES / FLOODING)  
→ REMOVAL OF STAGNANT WATER

WATER / SEWER - TRANSITE PIPES

→ REPLACE OLD WATER LINES - INCREASE SIZE  
(ALL 4 CATEGORIES)

→ ADDITIONAL WELL, TANK

# Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

## Dudley Table 3

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	Winter Storm	Floods	Wind Event	Extreme Temperatures	Priority	Time
								H - M - L	Short Long Ongoing
<b>Infrastructural</b>									
Dams (Merino / Carpenter)	See Map	Town	B (both)	F - design, permit, build (engineering / financial costs) cost avoidance				H	S/L
Schools / Town Buildings (Shelter)	See Map	Town	B (both)	All - new regular access roads - easing funding (wetland - ConCom)				H	S
Access Roads/ Highway Department / SHFRHS	See Map	Town	V	HWD - new HWD facility but same location				M/H	L
Drainage System - stormwater on roadways	See Map	Town	V	WS/F - need a S.W study for Dudley - Southbridge + West Main St. / design , build				H	O
Water / Sewer System - pump station #6	See Map	Town	V	AMGP/WS/F/FEMA - sewer station needs generators (sewage - health risk to community) , replace older transite water mains, alterantive energy sources (solar/battery)				H	S/L
Communication / I.T Network	See Map	Town	V	All - continuity and backup of services (study and design c. build), police repeater needs generator B.U power				M/H	O/S
Roadways / Evacuation	See Map	Town	B (both)	F - revisit evacuation plan, check contracts for emergency transportation				M/L	O
New Water Sources	TBD	Town	V	WS/F/XT - study required, regulatory issue, permits, explore options for interconnection				H	L
Power Lines	Everywhere	Utility	V	All - street tree bylaw (max height 20-25 ft), stay on trimming program, funding issue, need a gypsy moth program				M/L	O
Railroad	See Map	P&W	V	All - continue to coordinate - communication				L	O
<b>Societal</b>									
Senior Housing (Joshua Place)	See Map	Town / State	B (both)	All - senior safe program, continue to coordinate with COA				L	O
Budget		Town	V	All - continue to research other grants and sources of funding				H	O
Landuse Bylaws - zoning stormwater		Town	B (both)	All - review bylaws, town policies, subdivisions, zoning				M	O
Employer Centers		Private	B (both)	All - coordinate actions, public outreach				L	O
Jericho Neighborhood	See Map	Private	V	All - comprehensive vulnearability study (children, elderly, drugs, language, poverty)				M	O
Private Wells / Septic Systems	Everywhere	Private	V	All - effectiveness + property values affected by lowering of watertable / Title V (CDBG program - new wells / septic systems) & power lines + B.U power (public service message / good neighbor program?)				M	O
Transient Population - schools	Grow Schoool - Nichols College	Private	S	All - coordinate / evacuation plan				L	O
Homeless Camp	See Map	N/A	V	All - outreach - state agency, backpack brigade, non-profits				L	O
Services / Food / Medical		Private	B (both)	All - coordination of services , non-profits				L	O
Abandoned Property	See Map	Private	V	All - economic policy, state programs, historic register (fire safety)				M	O
<b>Environmental</b>									
Open Land - Chapter 61A	See Map	Private	B (both)	All - investigate funding options to purchase/develop for community good - agri-business, open space				M	O
Open Space - land trust / rail trail	See Map	Private / Town	S	All - coordinate + help reinforce				M	O
Lakes, Ponds, Rivers (recreational)	See Map	Private / Town	B (both)	WS/F/X - vulnearability assessment				M	O

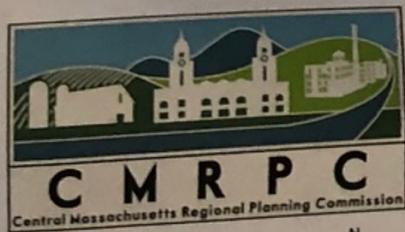
Trees / Forest (pest / fire / powerlines)	See Map	Private / Town	B (both)	All - vulnearbilty assessment / debris program, forest management	L	O
Water Resources (aquifers)	See Map	Town	V	WS/F/XT - see water sewer system above *	H	O
Insect / Disease / Invasive Planats	See Map	Private / Town	V	X/F - vulnearbilty assessment, mosquito program	M	O
Chemical - storage / use / transport	Townwide	Private / Town	V	All - coordination with F.D, local emergency planning	M	O
Impervious Surfaces	See Map	Private / Town	V	WS/F - town policy - review of bylaw changes (LID)	L	O
Environmental Regualtion - ConCom	N/A	Town	B (both)	All - town policy - review of bylaw changes (LID)	M	O
Wetlands / Lowlands	See Map	Private	B (both)	WS/F - continue to protect with enforcement + policy (see drainage)	L	O

# Municipal Vulnerability Preparedness (MVP) Workshop: Dudley

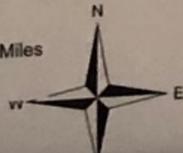
Reference Map:  
Table Map  
# 3

## Legend

- Town Boundary
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- State Police
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- Hazard
- Vulnerable Critical Infrastructure
- Hazard
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure
- Hazard



0 0.091.18 0.36 0.54 0.72 Miles



CONNECTICUT



TABLE #3

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, heat wave, etc.)

Features	Location	Ownership	V or S	WINTER STORM	FLOODS	WIND EVENT	XTREME TEMP	Reality		Vote	
								Priority	Time		
								H-M-L	Short Long Ongoing		
<b>Infrastructural</b>											
Dams (Merino/Carpenter)	See Map	Town	V/S	F- Design, Permit, Build (Engineering/Financial Cost) Cost avoidance				H	S	L	●●●●
Schools (Sluiter) / Town Buildings	See Map	Town	V/S	ALL- New access Roads - easier funding (wetland-Consom) Regular				H	S	S	●●●●
Access Roads Highway Dept / SHRHS	See Map	Town	V	HWD - New HWD Facility - Same Location				M/H		L	●
→ Drainage System / Roadways	See Map	Town	V	WS/F - Need a study - Dudley - Southbridge @ West Main St / Design, Build				H		O	●●●●
Water/Sewer System - Pump Station	See Map	Town	V	WS/F Generators (Sewage - health risk to community) Sewer station need				H		O	●●●●
Communication/IT Network	See Map	Town	V	ALL Continuity and Backup of Services Police Repeater needs Generator BU Power				M		O	●●●●
Roadways / Evac	See Map	Town	S/V	F - Revisit Evac Plan, Check Contracts for Transportation (Emergency)				M/L		O	●
Water Sources - New	TBD	Town	V	WS/FX Study Required, Regulatory Issue, Permits, Explore options for interconnection				H		L	●
Power Lines	Everywhere	Utility	V	ALL - Street Tree By-Law (Max height 20-25 ft), Stay on Trimming Program, (Funding Issue)				M/L		O	●
Rail road	See Map	P&W	V	ALL - Continue to coordinate - communication				L		O	
<b>Societal</b>											
Senior Housing (Joshua Place)	See Map	Town/St	S/V	ALL - Senior Safe Program, Continue to Coordinate with COA				L		O	
Budget		Town	V	ALL - Continue to research other grant and sources of funding				H		O	●
Land Use BY-LAWS (Zoning Storm Water)		Town	S/V	ALL - Review Bylaws, Town Policies, Subdivisions, Zoning				M		O	
Employer Centers		Private	S/V	ALL - Coordinate Actions, Public Outreach				L		O	
Jericho Neighborhood	See Map	Private	V	ALL - Comprehensive Vulnerability Study (Children, Elderly, Drugs, Language, Poverty)				M		O	●
Private Wells/Septic Systems	Everywhere	Private	V	ALL - effectiveness @ Property Values affected by lowering of water table / Title V				M		O	
Transient Population (Schools)	Grow Sch Nichols Col	Private	S	ALL - Coordination / Evacuation Plan				L		O	
Homeless Camp	See Map	NA	V	ALL Outreach - State Agency, Backpack Brigades, Non-Profits				L		O	
Services/Food/Medical		Private	S/V	ALL - Coordination of Services, Non-Profits				L		O	
Abandoned Property (Mills)	See Map	Private	V	ALL - Economic Policy, State Programs, Historic Register (Fire Safety)				M		O	
<b>Environmental</b>											
Open Land - Chapter 61A	See Map	Private	S/V	ALL - Investigate Funding Options to purchase/develop for Community Good				M		O	●●
Open Space - Land Trust / Rail Trail	See Map	Private/Town	S	ALL - Coordinate & help reinforce				M		O	
Lakes, Ponds, Rivers (Recreational)	See Map	Private/Town	S/V	WS/FX - Vulnerability Assessment				L		O	
Trees / Forest (Pest/Fire/Power Lines)	See Map	Town/Private	S/V	ALL - Vulnerability Assessment / Debris Program, Forest Management				H		O	
Water Resources (Aquifers)	See Map	Town	V	WS/FX - "See Water Sewer System Above"				M		O	
Insect / Disease / Invasive Plants	TownWide	Town/Private	V	X/F - Vulnerability Assessment, Mosquito Program				M		O	
Chemical - Storage/Use/Transport	See Map	Private	V	ALL - Coordination with F.D., Emergency Planning				M		O	
Impervious Surfaces	See Map	Private/Town	V	WS/F - Town Policy - Bylaw Changes *LID				M		O	
Env. Regulation - Consom	NA	Town	S/V	ALL				L		O	
Wetlands / Low Lands	See Map	Town/Private	S/V	WS/F - Continue to protect with Enforcement Policy (See Drain)				L		O	

Power Lines

x Drainage

School Complex / Shelter POD

Communication Network

Water Sewer

(Pumping Station)  
(Generators)

Tier 2 Businesses (Shields, Web Co, Gorte  
MACE)

\* DAMS Marino / Carpenter

Roadways

Railroad

Evac Routes

+ Municipal Buildings - DPW

# Societal

Joshua Place - Assst Living

x Nichols College

x SHRHS

Jericho - Neighborhood

Group Homes

x Grow School

Homeless Village

Prof/Volunteer Fire/First Response Services

Abandoned Properties (mills)

Employment

Services / Food / Medical

Land Use By Laws

St. Andrews - Soup Kitchen

Budget - Emergency / Infrastructure

# Environmental

Wetland

Env. Regulatory  
Concern

Low Lands

Insect Vectors

→ Land Trust / Open Space

Impervious Surfaces

Chemicals — Storage / Transport

Water Resources

X Lakes & Ponds / Rivers

Trees / Forest /

Beaver Dams

Gypsy Moths / Beetles

Wind Tunnels

~~Farm Land~~

Bike Paths — Recreational (Water  
walks)

# Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

## Dudley Table 4

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.)

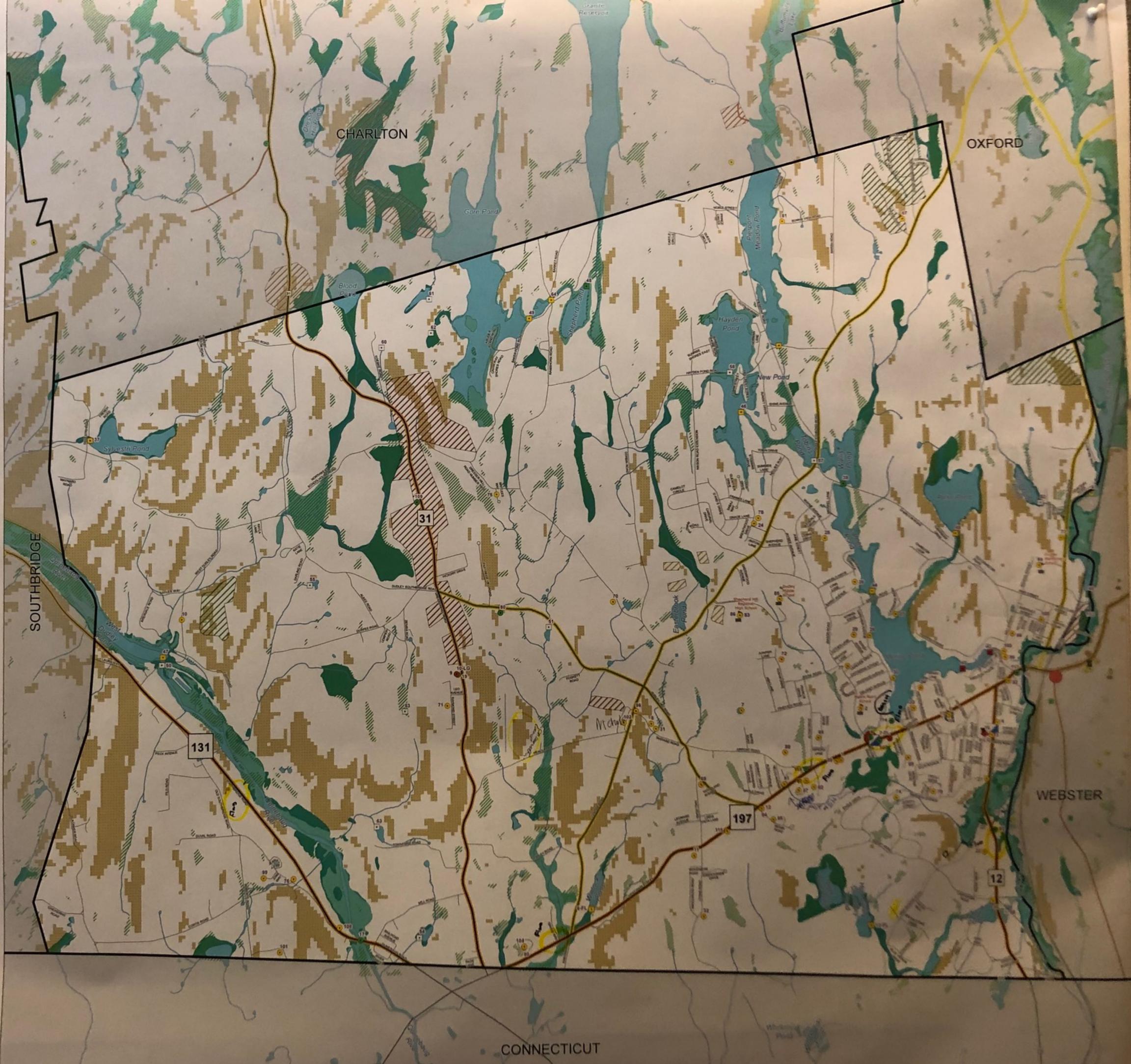
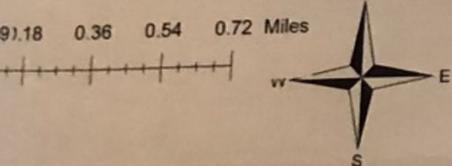
Features	Location	Ownership	V or S	Flooding	Wind Events	Winter Storms	Extreme Temepratures	Priority	Time
								H - M - L	Short Long Ongoing
<b>Infrastructural</b>									
Roads - drainage, down trees	131, 197 (W. Main), 12 (Schofield)	State	V	More retention ponds, add in swales + rain gardens, replace pipes - larger, more tree trimming				H	S/O
Sewage System - septic	Schofield (Townwide)	Town	V	Preventative maintenance, rebuild infrastructure, assess system vulnearability, see roads above				H	S/O
Water Supply - private wells	Schofield Ave, New Boston Rd.	Town	V	Reduce flooding (LID), rainwater retention + collection, improve drainage				H	S/O
Home Drainage	Townwide	Private	V	Improve drainage / assistance to homeowners to improve drainage - outreach and trim trees				M	O
Electrical Grids / Power Supply	Townwide	Private	V						
Dams		Private / Town	B (both)	Pack and pond dam - replace				L	L
Bylaws		Town	B (both)	Enforcement and review of exisiting bylaws related to stormwater management + conservation				M	L
Schools Access	School St. Dudley-Oxford	Town	V	Find a second egress, safe routes to school, add sidewalks				M	L
Highway Department	Indian Rd.	Town	V	Find a second egress, clear some trees, widen road, add drainage				M	L
Nichols > Sidewalks	Center	Nichols	B (both)	Share resources more, use their facilities more, assist town with grant writing				M	O
<b>Societal</b>									
Senior / Veteran	Townwide		B (both)	More hours for senior center, more funding, database of all seniors / veterans, better communication - outreach in emergencies				H	S/L
Renter / Low Income	Jericho		V	Better communication + need transporation to cooling center, shelters				H	S
Farms / Agriculture	Townwide		B (both)	Supporting local agriculture - buy local, community gardens, emergency water supplies, protection of farmland				M	L/O
Disabled	Jericho		V	Rehab services in shelters, provide safe transportation (bus / walking)				H	S
Police / Fire	West Main St.	Town	S	Maintain adequate funding + resources				L	O
Communication System - RAVE / cell			B (both)	Improve cell service				H	S/O
Civic Groups	Townwide		S	Better communication between groups, sharing information, resources				M	O
Schools	Mason Rd., School St. Dudley-Oxford		B (both)	Second egress, safe routes to schools				M	L
Municipal Center	West Main St.	Town	S	Preventative maintenance, promote services, improve communication about services				L	O
DCLT / Churches / Business			S	More funding for land acquisition / land donations				M	O
<b>Environmental</b>									
Potash Brook		Town	V	Bigger culverts, better retention ponds, natural rentention areas, flood storage				H	S/O
Forested Areas - fire / recreation	Townwide	Private / Town / Conservation	B (both)						

Insects - bats, balance environment, vaccination, lyme / EEE	Townwide		B (both)	Maintain / support predator populations, more vaccination clinics	H	S/O
Wetland	Townwide		B (both)	More preservation, funding, upkeep		
Ponds	Townwide		S	More preservation, funding, upkeep		
Conservation Land	Townwide		S	More preservation, funding, upkeep		

**Municipal Vulnerability Preparedness (MVP) Workshop: Dudley**

Reference Map:  
Table Map  
# 4

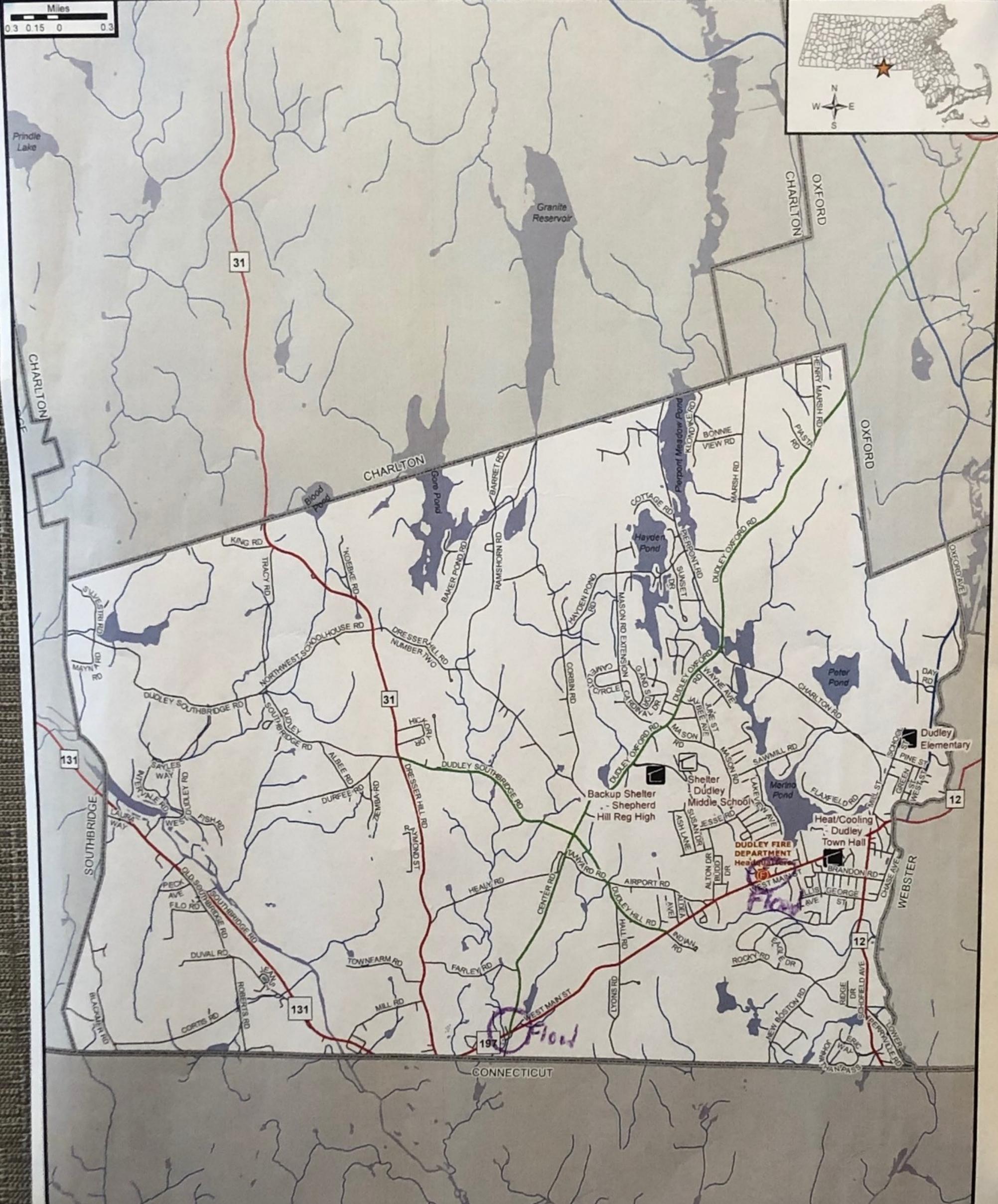
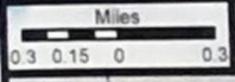
- Legend**
- Town Boundary
  - Town Halls
  - EOC
  - Local Police
  - State Police
  - Fire Station
  - Schools (Pre-K through High School)
  - Dams**
  - High Hazard
  - Significant Hazard
  - Low Hazard
  - N/A
  - Major Road
  - Local Road
  - Active Service Railroads
  - Water Bodies
  - Streams
  - MassDEP Wetlands
  - High Slope (15% and above)
  - FEMA National Flood Hazard Layer (DFIRM)**
  - 100-year Flood Area
  - 500-year Flood Area
  - CIH (Points)**
  - Vulnerable Critical Infrastructure
  - Non-vulnerable Critical Infrastructure
  - Hazard
  - Vulnerable Critical Infrastructure
  - Hazard
  - Vulnerable Critical Infrastructure
  - Non-vulnerable Critical Infrastructure
  - Hazard



Map data source: FEMA's Digital Flood Insurance Rate maps (DFIRM). Other data sources include MassGIS, MassDOT, and CMRPC. Information depicted on this map is for planning purposes only. This map is not a warranty.

# Reference Map: Evacuation Routes & Shelters

## Town of Dudley, Massachusetts



**Legend**

	Town Boundary		Major Road
	Water Bodies		Local Road
	Shelter		Locally Identified Shelter

**Evacuation Routes**

	Highway		Secondary
	Primary		Tertiary

Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.



One Mercantile Street, Suite 520 - Worcester, MA 01508

### Municipal Vulnerability Preparedness (MVP) Workshop

TABLE # 4

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, heat wave, etc.)

Features	Location	Ownership	V or S	FLOODING	WIND EVENTS	WINTER STORMS	EX. TEMPS	Priority		Vote
								H-M-L	Short Long Ongoing	
-131										
ROAD FLOODING - DRAINAGE - TREES DOWN	127 WEST MAIN 12 (SCHOFIELD)	STATE	V	More retention ponds, Add in swales + rain gardens, replace pipes - larger				H	S/O	●●
SEWAGE SYSTEM, Septic	SCHOFIELD (TOWN WIDE)	TOWN	V	Preventive Maint., rebuild infrastructure, All of the above ↑, Assess system vulnerab.				H	S/O	
WATER SUPPLY, private wells	SCHOFIELD AVE NEW BOSTON RD	TOWN	V	Reduce flooding (LID), Rainwater retention + collection, Improve drainage				H	S/O	●●
HOME DAMAGE	Town wide	PRIVATE	V	Improve drainage, <del>funding</del> assistance to homeowners to improve drainage - and outreach Trim trees				M	O	
ELECTRICAL GRID / Power supply	Townwide	PRIVATE	V							
DAMS		TOWN PRIVATE	S+V	Packard Pond Dam - Replaced				L	L	●●
BY LAWS		TOWN	S+V	Enforcement and Review of existing bylaws related to stormwater management + conservation				M	S/O	
HIGHWAY DEPT.	INDIAN RD	TOWN	V	Find a second egress, clear some trees, widen road, add drainage				M	S/L	
SCHOOLS ACCESS	MASON RD SCHOOL DUDLEY OXFORD ST.	TOWN	V	Find a second egress, Safe Routes to School, Add sidewalks				M	L	
NICHOLS	CENTER	NICHOLS	S+V	Share resources more, use their facilities more, assist Town with grantwriting				M	O	
Societal > Sidewalks										
SENIOR/VETERAN	TOWNWIDE		S+V	More hours for Senior Center, More funding, Database of all seniors/veterans, Better communication - outreach in emergencies				H	S/L	●
RENTER/LOW INCOME	JERICHO		V	Better Communication + Need Transportation to cooling centers, shelters				H	S	
FARMS/AGRIC	TOWNWIDE	TOWNWIDE	S+V	Supporting local agriculture - Buy Local, Community gardens, Emergency water supplies, Protection of farmland				M	L/O	●●●●
DISABLED	JERICHO		V	Rehab seats in shelters, provide safe transportation (bus, walking)				H	S	
POLICE/FIRE	WEST MAIN	TOWN	S	Maintain adequate funding + resources				L	O	
COMMUNICATION SYSTEM - RAVE CELL			S+V	Improve cell service				H	S/O	
CIVIC GROUPS	TOWNWIDE		S	Better communic. between groups, sharing information resources				M	O	
SCHOOLS	MASON RD - School DUDLEY OXF ST		S+V	Second egress, Safe routes to schools				M	L	●●
MUNICIPAL CENTER	WEST MAIN	TOWN	S	Preventive maintenance / Promote services / Improve communication about services				L	O	
DCLT CHURCHES			S	More funding for land acquisition / Land donations				M	O	●
Environmental > Businesses										
POTASH BROOK		TOWN	V	Bigger culverts, better retention ponds, natural retention areas, Flood storage				H	S/O	
FORESTED AREAS - FIRE RECRE	TOWN WIDE	TOWN PRIVATE - CONS.	S+V					H	S/O	●●
INSECTS - BATS - BALANCE ENVIRON. - YACCIN. - LYME, EEE			S+V	Maintain / Support predator populations more vaccination clinics						
WETLAND			S+V	More preservation, funding, upkeep						
PONDS			S							
CONSERVATION LAND			S							

# Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

## Dudley Table 5

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.)

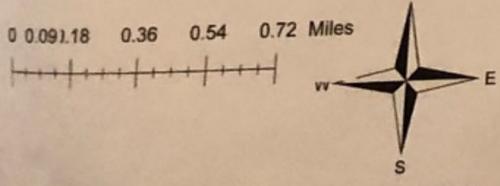
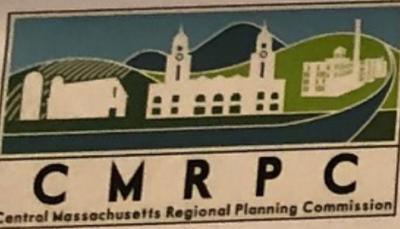
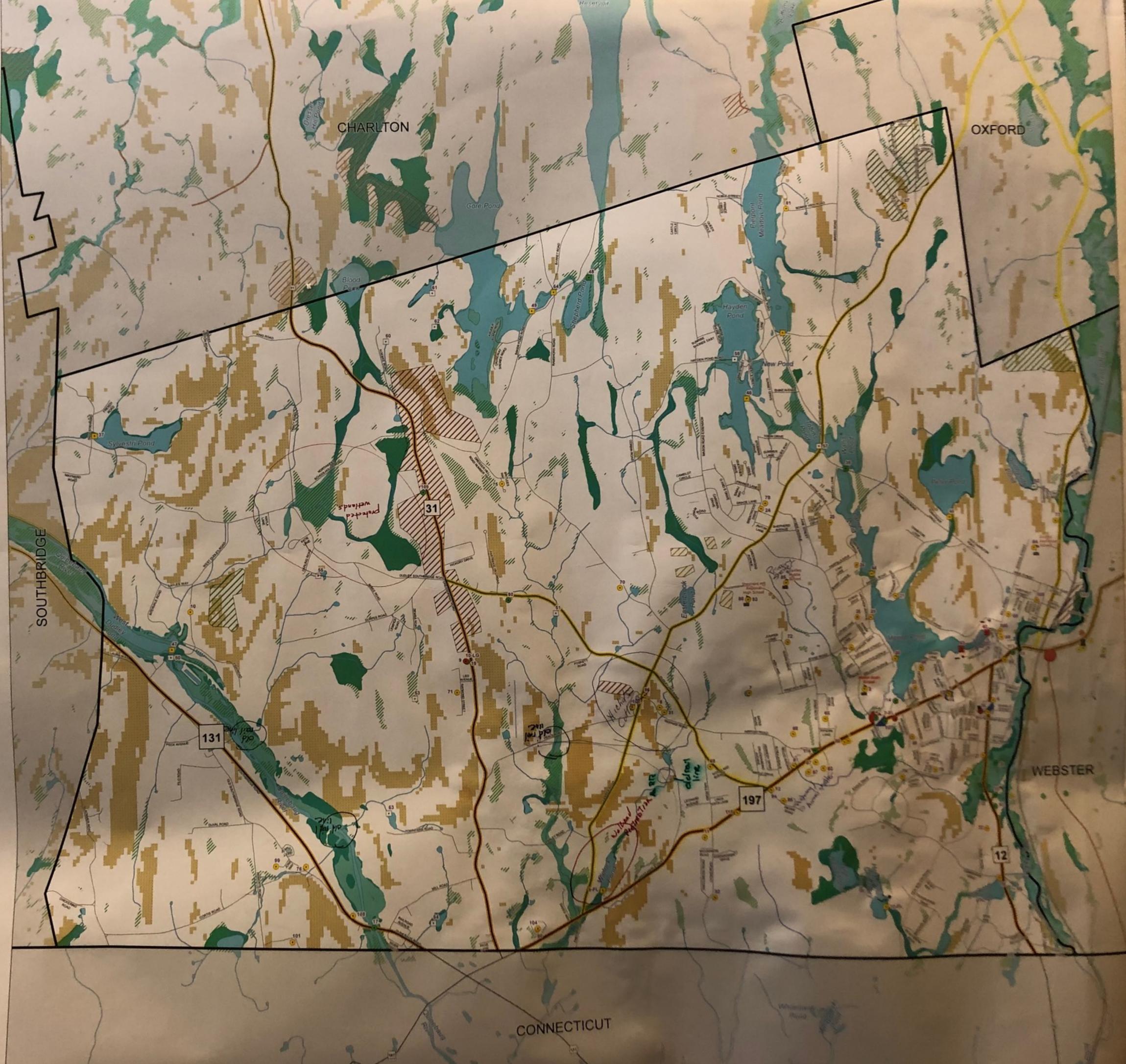
Features	Location	Ownership	V or S	Flooding	Wind Events	Winter Storms	Extreme Temperatures	Priority		Time	
								H - M - L		Short	Long
<b>Infrastructural</b>											
Evacuation Routes in Town	West Main - Fire Station to Center Rd. (Vulnerable)	State	V	Evacuation signs for public, repair section of road and drainage				M			S
Culverts - include in stormwater management	Intersection of Center Rd. and West Main (in front of Yummy's Restaurant) + Post Office	State	V	Repair for flooding				H			L
Dams	Townwide	Town	V	EAP's for dams (Emergency Action Plan) - repair up to standards				H			L
Development	Various Locations	Private	S	Consider low impact development (LID) - to enhance the environment				L			L
Additional Water Supply	Townwide	Town	V	Investigate additional town sites for water supply - continued water supplies for possible drought conditions				H			O
Second Egress for Town Facilities - highway garage / recycling / animal shelter		Town	V	Another egress (even a graded dirt road). Dudley Middle is primary shelter in storms / extreme heat etc. Highway dept. - one way in / one way out. Equipment is need during catastrophe				M			L
Municipal Buildings	Town Hall / Library	Town	S	Need policies to guide municipality if there is a top hazard. Would be part of EAP				M			O
Abandoned Railroad	See Map	Town	V	Evaluate / check for hazard railroad culverts and determine the best cause of action				L			L
Overhead Powerlines	Townwide	Town	B (both)	Winter storms / ice storms / down trees and limbs. Continue to support tree trimming initiative and support national grid				H			O
Stormwater Management	Townwide	Town	V	Mandated by DEP/EPA. Action to do study for vulnerable areas to determine problematic sites				H			O
<b>Societal</b>											
Home Schooled Population	Townwide	Town	????	Emergent communication. Develop a means/network + town + families that homeschool. Sign up for emergency alert system (RAVE) would help				M			O
Development	Townwide	Private	S	Communication with new residents. Welcome packets with town / emergency information				L			L
Language	Townwide	Private	V	Emergency communication (to include non-English speaking individuals)				M			O
Older Population	Townwide - Housing Authority (new construction)	Private	V	Housing for elderly. Need more units. Developing a plan / emergency transportation plan for non-mobile people - disabled				M			O
Central Recreation Area - passive recreation	West Main	Town	S	Develop a park in such a way to mitigate hazards - walking track / dog park				L			O
Small Homeless Population	Various Locations	Town	S	Find ways for homeless to connect to information to keep them safe				M			O
French River	Eastern Dudley	Town	S	Needs recreation - but continue to protect				M			O
Forest Management	Various 1600 acres of APR	Private / Town	S	Wind + winter events - further develop + maintain + forest management plan				M			O
<b>Environmental</b>											

Brooks	Townwide	????	B (both)	Stormwater management	M	O
Development	Townwide	Private	S	Stormwater management - LID - lower impact development	L	S
Additional Water Supply	Townwide	Town	V	Water department has been working on this issue - water management plan	H	O
Wetlands	Townwide	Private / Town	S	Protect wetlands - to act as flood mitigation - enjoyment for birds	M	O
French River	Eastern Dudley	????	S	Recreational - work with adjacent communities for more grant money	M	O
Hazardous Trees	Townwide	Dudley	V	Need funds for tree trimming / management. Plan to manage	H	S
Forest Management	Townwide	Private / Town	S	DCLT - open space + recreation plan	H	S
Mosquitos (EEE)	Townwide	Private / Town	V	Encourage program for bat houses + funding for spraying	H	O

**Municipal Vulnerability Preparedness (MVP) Workshop: Dudley**

Reference Map:  
Table Map  
**# 5**

- Legend**
- Town Boundary
  - Town Halls
  - EOC
  - Local Police
  - State Police
  - Fire Station
  - Schools (Pre-K through High School)
  - Dams**
  - High Hazard
  - Significant Hazard
  - Low Hazard
  - N/A
  - Major Road
  - Local Road
  - Active Service Railroads
  - Water Bodies
  - Streams
  - MassDEP Wetlands
  - High Slope (15% and above)
  - FEMA National Flood Hazard Layer (DFIRM)**
  - 100-year Flood Area
  - 500-year Flood Area
  - CIH (Points)**
  - Vulnerable Critical Infrastructure
  - Non-vulnerable Critical Infrastructure
  - Hazard
  - Vulnerable Critical Infrastructure
  - Hazard
  - Vulnerable Critical Infrastructure
  - Non-vulnerable Critical Infrastructure
  - Hazard



Flooding data source: FEMA's Digital Flood Insurance Rate maps (DFIRM).  
Other data source: MassDOT and CMRPC.

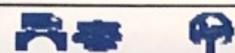


TABLE #5

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, heat wave, etc.)

Features	Location	Ownership	V or S	Flooding	Wind Events	Winter Storms	Extreme temperatures	Priority		Vote
								H-M-L	Short Long Ongoing	
Infrastructural										
Evacuation Routes in town	West Main - Fire Station to Center Rd (vulnerable)	State Highway	✓	- Evacuation signs for public repair section of road - drainage				M	S	
Culverts - include in storm water mgmt.	Intersecting Center Rd/West Main - Jumps post office	State	✓	repair for flooding				H	L	●●●●
Dams	town owned lodams	Dudley	✓	ERP's for dams (Emerg Action Plan) - repair - up to standards.				H	L	●●●
Development	Various locations	Private	S	to consider Low Impact Development (LID) - to enhance the environment				L	L	
Additional water supply	town	Dudley	✓	to investigate additional town sites for water supply, - Contained water supplies for possible drought conditions				H	O	●●
Second egress for town facilities (highway garage/recycling/animal shelter)		Dudley	✓	another egress (even a graded dirt road). Dudley Middle is primary shelter in storms/extreme heat etc. Highway Dept - one way in/one way out. Equipment is needed in catastrophe.				M	L	
Municipal Buildings	town hall/library	Dudley	S	need policies to guide Municipality if this is a top hazard. would be part of Emerg. Action Plan (needed)				M	O	
abandoned railroads -	see map	Dudley	✓	evaluate/check for hazard railroad culverts and determine the best course of action.				L	L	
Overhead powerlines	town wide	Dudley	✓/S	Winter storms/ice storms/drain trees/limbs. continue to support removal of hazard trees and support National grid.				H	O	
Stormwater Management	town wide -	Dudley	✓	mandated by DEP/EPA. Action to do study for vulnerable areas to determine areas problematic sites				H	O	
Societal										
Home schooled population	town wide	" "	?	communication. Develop a means/network of town + facilities that homeschool. Sign up for emergency alert system (RAVE) would help.				M	O	
Development	town wide	Private	S	communication & new residents. Welcome packets with town/emergency information.				L	OL	
Limited English	" "	Private	✓	emergency communication.				M	O	
Older population	Housing Authority - new construction	Private	✓	Housing for elderly. Need more units. Developing a plan/emergency transportation plan for non-mobile people. - Disabled				M	O	●●●●
school age population	" "	" "	✓	communication. - Programs for children - Develop summer programs.				M	O	
Central Recreation area - passive recreational	West Main area	Dudley	S	Develop a park in such a way to mitigate hazards - walking track./dog park.				L	O	
Small homeless population	Various	Dudley	✓	find ways for homeless to connect to services to keep them safe.				M	O	
French River	Eastern Dudley	Dudley	S	needs recreation - yet to protect.				M	O	
Forest Management	Various 1600 acres of APR	Dudley/Private	S	Wind + Winter Events - further develop & implement forest management plan.				M	O	●
Environmental										
Brooks	town wide	?	S/V	Storm water management				M	O	
Development	" "	Private	S	" " LID - Low Impact Development				L	S	
Additional water supply	" "	Dudley	✓	water department has been working on this issue. Water management Plan.				H	O	●●●●
Wetlands	" "	Private/town	S	Protect Wetlands - to act as flood mitigation. - Enjoyment for birds.				M	O	
French River	Eastern Dudley	?	S	recreational. - work with adjacent communities for more grant money.				M	O	
Hazardous trees	town wide	Dudley	✓	Need funds for tree trimming/management. Plan to manage				H	S	●
Forest Management	" "	Dudley/Private	S	DELTA - open Space + Recreation Plan.				H	S	●
Mosquitoes (EEE)	" "	" "	✓	Encourage program to fix bad houses. Funding for spraying				H	O	

Sewer System + Water supply  
system - <sup>Reduce</sup> flooding - better drainage +  
Stormwater infrastr.

Low-income, elderly, disabled - emergency  
services, transportation, communication

Natural retention, stormwater in filtration to  
control flooding.

<sup>first</sup>  
Dams - Need to be replaced - Assess first

Senior housing - upgrade, buildings, add alternative  
power sources.

Mosquitoes + insect borne diseases - Early warning,  
public awareness, environmentally sensitive pesticides

Communications - Emergency Mngmt. - <sup>upgrade</sup> Copper to Fiber

Table 5

- Dams - all Town-owned ✓  
EAPs required by DEP.

Route 197  
Flooding - Funding for assistance w/ HHS

- Additional water supply for Town ✓✓

Adequate tree trimming  
- Better rel. + commun. w/ utilities

- Stormwater management ✓✓  
Culverts - Repair + manage

Senior/  
- Elderly housing - Independent power supply ✓  
Expanded - more housing

- Homeschool population - Connect better, improve commun.

- EEE - Better management. Spraying etc.

Table 3

Support Agriculture / Farmland

~~Drainage, stormwater man~~

Access to highway + Schools  
Barn

Street trees - more \$ tree maint.

Secondary access to both

Jericho Neighborhood - Vulnerable populations - immigrant + Pop's.

Abandoned properties - fire hazards

better

Open land - More funding, more acquisition, use, management  
Water Resources - Additional water source

Theme	Project Type	Category	Location	Recommended Action	Hazard
<b>High Priority</b>					
<b>Water</b>	Dams		Merino / Lower Merino	Perform dam assessment - Removal vs. Repair: estimate engineering and financial cost to design, permit, and construct. Ensure cost avoidance.	
			Carpenter Rd.		
			Townwide		
	Wells		Townwide	Ensure backup power to town wells, promote stronger water conservation efforts in new construction. Estimate current standing of the watertable and address potential impacts (property value, health of aquifer, etc.) Potentially scout for new water sources.	
	Water Supply		Schofield Ave.	Work on retention and collection of water through private and town owned wells.	
			Townwide	Study required to explore new options that can be interconnected with current supply. Investigate additional town sites for water supply - continued water supplies for possible drought conditions. Construct a water management plan.	
	Drainage		West Main St. at Marry's and the Fire Station	Need to engineer pipe in front of post office to further improve drainage. Need a S.W study. Keep fire station drainage operational and efficient.	
			Townwide	Engineer, repair, or replace existing. Need S.W study for Dudley-Southbridge. Improve drainage assistance to homeowners.	
			Route 131	Introduce more retention ponds, add in swales, rain gardens, and replace the pipes with larger ones.	
			Route 12		
	Stormwater Management		Townwide	Keep management bylaws as an updated working document and maintain public awareness. Review bylaws for zoning of stormwater. Action needed to do a study for vulnerable areas to determine problematic sites (mandated by EPA/DEP)	
			Intersection between 197 and Center Rd.	Work with MassDOT to work on flood management	
			Intersection between 197 and Prospect Ave.		
			Intersection of Center Rd. and West Main (in front of Yummy's Restaurant) + Post Office	Construct culverts to divert stormwater management. Make repairs for flooding.	
	Greywater (Septic and Sewage)		Townwide Sewage	Engineer, repair, or replace.	
Pump Station #6			Sewer station needs generators or alternative power solutions (sewage is a health risk to community), replace older transite water mains.		
Private Septic			Need a CDBG program to construct new systems.		
Townwide Septic			Preventative maintenance and system vulnerability assessment needed. Rebuild infrastructure.		
<b>Roads</b>	Access		Indian Rd. highway and shelter	Engineer and construct a second access. Make the access road to the Highway Dept. wider.	
			SHRHS/Middle School on Oxford Rd.	Engineer and construct a second access with sidewalks.	
			Town Buildings (Highway Dept.)	Construct new access roads	
<b>Invasive Species/Insect/Disease Control</b>	EEE		Townwide	Institute early warning, public awareness, research coalitions, environmental safety precautions, and training education needed. Consider joining regional moquito control or introducing bat houses. Open more vaccination clinics.	
	Invasive Pests			Increase communication and awareness about invasive species in waterbodies.	

Theme	Project Type	Category	Location	Recommended Action	Hazard
<b>Medium Priority</b>					
Communication	Information Technology		Town Hall	Purchase and install equipment training system for I.T	
			Townwide	Create continuity and backup of services.	
	Communication Infrastructure		Townwide	Change all copper wiring to fiber line and upgrade equipment. Better communication between civic groups for sharing resources and information.	
	RAVE			Maximize number of people subscribed. Improve cell service for use of RAVE. Provide access to homeschooled families to use RAVE system.	
Community Engagement		Townwide	Introduce community gardens and information about local agriculture. Begin providing welcome services for new residents (welcome and emergency systems packets).		
Utilities	Gas Lines		Limited Extent of Town	Increase capacity and extend gas lines.	
	Powerlines			Stay on tree trimming program (follow street tree bylaw of 20-25 ft). Increase funding.	
	Electric		Townwide	Use alternative energy sources for key utilities, institutions, as well as build stronger relationships with utility companies. Removal and replacement of trees also needed for this.	
	Tree Trimming			Work with utilities to clean up trees. Work on getting a gypsy moth program.	
Roads	Evacuation Routes		Townwide	Revisit evacuation plan (for town and schools) and check contacts for emergency transportation. Post evacuation signs for public, repair sections of the road and drainage for easier access to routes.	
	Sidewalks			Provide sidewalks around new facilities and schools to gain more access for public.	
Elderly/Veteran Community	Senior Housing		Joshua Place	Consider shelter upgrade with a conversion to an alternative power source. Provide more transportation and communication to seniors during outage or storm events. Create a senior safe program that works with the COA.	
			Townwide	Construct more housing units with a plan for emergency transportation for non-mobile residents.	
	Elderly Programs		Senior Center	Invest in advertisement. Provide more hours for the senior center as well as more funding to maintain census of senior/veteran/disabled population. Provide better communication resources for outreach during emergencies.	
Low Income/ Homeless/Non-English Speaking Community	Low-Income		Jericho	Do a comprehensive vulnerability study (children, elderly, drugs, language, and poverty). Provide better communication and transportation for cooling centers, shelters, and for emergency services. Provide resources (rehab and transportation) for disabled citizens.	
	Education		Townwide	Provide a community liaison to non-English speaking population. Ensure resources to school and the public library.	
	Homeless		Homeless Camp	Find resources for aid (state agency, backpack bridge, or non-profits). Provide access to communication systems and information for their safety.	
Forest Management and Conservation Land	Forest		Townwide	Do a vulnerability assessment of the forest and provide a debris and forest management program.	
	Regulation			Have the Conservation Committee review any town policy or bylaw changes, and take initiative on those changes.	
Forest Management and Conservation Land	Conserved Land		Townwide	Find more funding for preservation. Coordinate and reinforce conservation practices on land that is already protected.	
	Open Space			Investigate funding options to purchase/develop for community good.	
<b>Low Priority</b>					
Recreation	Park		West Main	Develop a park in such a way to mitigate hazards. Provide both walking trails or track and a dog park.	
	Lakes, Rivers, Ponds		Townwide	Do vulnerability assessments for bodies of water that are used recreationally.	
			French River	Work with other adjacent communities to attain grant money and other funding to provide a recreational area and further maintain preservation efforts.	
Wetlands and Waterbodies	Protection		Townwide	Continue to protect with enforcement. Maintain and enhance preservation, funding, and maintenance of waterbodies and wetlands.	
	Reinforcement		Potash Brook	Create larger culverts and more efficient retention ponds. Work on developing for efficient natural retention ponds and flood/stormwater storage.	
			Townwide	Introduce flood mitigation efforts for waterbodies. Enhance stormwater management for surrounding brooks and streams.	

## Town of Dudley Mitigation Strategies

OVERALL GOAL: Facilitate activity within the Town of Dudley that reduces the loss, and risk of loss, to persons and property

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k- 100k)/ Low (<\$50k)	Time needed to complete
<b>A. Structure &amp; Infrastructure Strategies</b>							
Finish upgrades of existing storm water drainage pipes on West Main Street with larger ones to mitigate the frequent flooding that occurs there.	FL, SS, ST	Highway, Mass DOT	Local, State	High	High	High	1 Year
Pursue funding to improve and repair Carpenter Road Dam	FL, SS, ST	Highway, State	Local, State	High	High	High	1-2 Years
Pursue funding to improve and repair Lower Merino Dam	FL, SS, ST	Highway, State	Local, State	High	High	High	1-2 Years
Replace the bridge on MA-131 which spans the Quinebaug River	FL, SS, ST	Highway, State	Local, State	High	High	High	1-2 Years
Work with appropriate officials to remove beavers and dam from the New Boston Road Pump Station	FL, SS, ST	Highway, State	Local, State	High	High	Medium	1-2 Years
Upgrade culvert at the Pearle Crawford Memorial Library	FL, SS, ST	Highway, Mass DOT	Local, State, Federal	High	High	High	1-2 Years

<b>Mitigation Strategy</b>	<b>Hazard(s) Addressed</b>	<b>Who?</b>	<b>Potential Funding Sources</b>	<b>Priority</b>	<b>Impact</b>	<b>Estimated Cost</b>	<b>Timeline</b>
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Study feasibility of removing Carpenter Road Dam, remove dam and make any improvement needed after the removal	DF	Highway, State	Local, State	High	Medium	High	1-2 Years
Pursue funding to conduct comprehensive engineering study to improve Wieloch Dam water run off and surrounding area to reduce flooding at intersection of Center Road and Route 197 (W. Main Street)	FL, SS, ST	Highway, State, MassDot	Local, State, Federal	High	High	High	1-2 Years
Maintain rail trail, ensure vegetative debris is clear of the trail.	WF	Highway	Local, State	High	High	Low	Ongoing
Sweep streets at least once per year to increase stormwater management capacity; capture and dispose of appropriately.	FL, SS, ST	Highway	Local	High	High	Low	Ongoing
Properly clean (at least annually, or more often as may be required) all stormwater structures and basins. Work with the state to ensure state infrastructure is maintained	FL, SS, ST	Highway, State	Local, State	High	High	Low	Ongoing
Study the Lower Merino Pond Dam area in regards to the Stevens Mill and potential impacts to Tri-Valley Elder Services. Raceway goes under the Stevens Mill. Follow up with results of the study to mitigate risk to the site	FL, SS, ST	Local State, Federal	Local, State, Federal	Medium	Medium	Medium	1-2 Years

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Study the impacts of shifting road by the high school and middle school to the opposite side of the telephone poles.	All	Highway, Mass DOT	Local, State, Federal	Low	Low	High	1-2 Years
Develop strategy to remove high hazard trees, develop an inventory of trees along the roadway	All	Highway, Tree Warden	Local	Medium	High	Medium	1-2 Years
Construct secondary means of egress at the Highway Department	All	Highway	Local, State	Medium	Medium	High	1-2 Years
Construct secondary means of egress at the High School/Middle School	All	Highway	Local, State	Medium	Medium	High	1-2 Years
Study and secure water source to increase the supply of potable water.	DR	TA, Water Dept.	Local State, Federal	Medium	High	High	4-5 Years
Work with the state to ensure dams are well maintained and funding sources available to repair and maintain the dams.	DF	Highway, State	Local, State	High	High	Low	Ongoing
<b>B. Preparedness, Coordination &amp; Response Action Strategies</b>							
Implement a vegetative debris management program to reduce debris and thereby mitigate risk of stormwater flooding, riverine flooding, winter storm damage, etc., such as through the Central Massachusetts Mosquito Control Project.	WF, FL, SS, ST	Highway	Local, State	Medium	Medium	Medium-High	1 Year

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Continue to pursue grants whenever possible for hazard mitigation projects, maintain the staff grant writer.	All	Grant Writer	Local, State Federal	Medium	Medium	Medium-High	Ongoing
Continue good working relationship with the utility companies to improve mitigation of threats, and improve communication during events; ensure satellite spaces within each community for temporary emergency headquarters.	SS, ST, HU	TA, EMD, Highway	Local, State	High	High	Low	Ongoing
Develop a means for sharing information on a regional basis about successful hazard mitigation planning and programs. Create a feedback loop to improve pre-disaster planning by establishing a formal post-disaster assessment process.	All	EMD, TA	Local, State Federal	Medium	Medium	Low	1-2 Years
Implement a Unified Incident Command program in place	All	EMD, TA	Local	High	High	Low	Ongoing
Continue to improve hazard warning systems, including Code RED, cell phone alerts and social media posts	All	EMD	Local, State	High	High	Low	Ongoing
<b>C. Education &amp; Awareness Strategies</b>							

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Educate all segments of the community in order to combat complacency and foster individual responsibility for mitigating disaster impacts	All	EMD	Local, State	High	High	Low	Ongoing
Promote use of full range of federal and state resources related to disaster mitigation such as educational materials, training, and National Weather Service forecasts	All	EMD	Local, State, Federal	High	High	Low	Ongoing
<b>D. Local Planning &amp; Regulatory Strategies</b>							
Continue to actively enforce and comply with State Building Code Requirements.	All	BI	Local	High	High	Low	Ongoing
Continue to actively enforce and comply with the Massachusetts Wetlands Protection and the town wetlands bylaw	All	CC	Local	High	High	Low	Ongoing
Continue communication/coordination between federal, state, regional, county, municipal, private, and non-profit agencies in the area of hazard mitigation	All	EMD, TA	Local	High	High	Low	Ongoing
Find funding to review and update the regional and local hazard mitigation plans on a five-year cycle.	All	EMD, TA	Local, State, Federal	High	High	Low	1 Year

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Incorporate hazard mitigation actions into appropriate local and regional plans – Master Plans, land use, transportation, open space, and capital programming.	All	All	Local, State	High	High	Low	Ongoing
Integrate hazard mitigation concerns into transportation projects (e.g. drainage improvements, underground utilities, etc.).	All	Highway, State	Local, State, Federal	High	High	Low-High	Ongoing
Continue the annual Capital Improvement Program to develop an ongoing five-year plan potential projects	All	All	Local	Medium	Medium	Low	Ongoing
Coordinate with stakeholders, such as the Dudley Land Trust, to collaborate in identifying hazard mitigation projects.	All	TA	Local	Medium	Medium	Low	Ongoing
Work with CMRPC on evacuation planning & re-routing post-disaster	All	TA, EMD, CMRPC	Local, State, Federal	Medium	Medium	Low	1-2 Years
Incorporate disaster mitigation concerns into the MEPA review process.	All	CC, State	Local, State	Medium	Medium	Low	Ongoing
Continue to integrate hazard mitigation concerns into subdivision, site plan review, 40B reviews, and other zoning reviews. In particular, require the consideration of downstream flooding impacts caused by new projects—even if the impacts cross town lines.	All	CC, PB, ZBA	Local	High	High	Low	Ongoing

Mitigation Strategy	Hazard(s) Addressed	Who?	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Description		Agencies involved		Political & economic viability: High/Med/Low	Mitigation impact: High/Med/Low	High (\$100k+)/ Med (\$50k-100k)/ Low (<\$50k)	Time needed to complete
Inventory shelter/emergency resources. Identify what services are available at the different shelters (e.g. food preparation, potable water, back-up electrical power, heat, showers, etc.) and whether the location of different shelters will be impacted by different hazards (i.e. whether flooding will make the shelter inaccessible to some residents). This would help ensure that suitable shelters are available for different types of natural hazards	All	EMD	Local	High	Medium	Low	1 Year

'Hazards Addressed' abbreviations:

DF	Dam Failure	DR	Drought
EQ	Earthquake	FL	Flooding
HU	Hurricane	OT	Other
SS	Severe Snowstorm/Ice storm/Nor'easter	ST	Severe Thunderstorm/Wind/Tornado
WF	Wildfire/Brushfire	XT	Extreme Temperatures

'Who? Agencies Involved' abbreviations:

BI	Building Inspector	CC	Conservation Commission
CMRPC	Central Mass. Regional Planning Commission	DOT	Mass. Department of Transportation
EMD	Emergency Management Director	PB	Planning Board
TA	Town Administrator	ZBA	Zoning Board of Appeals

# **TOWN OF DUDLEY**

**Municipal Vulnerability Preparedness (MVP)**

**Community Resilience Building Workshop**

**January 10, 2020**

# AGENDA



## Town of Dudley

### Municipal Vulnerability Preparedness

Friday, January 10, 2020

8:30am – 4:30pm; Registration at 8:00 am

Dudley Town Hall

71 West Main Street, Dudley, MA

## Workshop Objective

- Define extreme weather and climate related hazards;
- Identify current and future vulnerabilities and strengths;
- Develop and prioritize actions; and
- Identify opportunities for the Town to advance actions and reduce risks to build resilience

## Workshop Agenda

8:00am – 8:30am Registration, Networking & Coffee

8:30am – 10am:

- Welcome and Overview
  - Fire Chief Dean Kochanowski
- MVP Program Overview
  - Hillary King, Central Region MVP Coordinator, EOEAA
- Overview Presentation
  - Peter Peloquin, CMRPC
- Climate Change Projections and Impacts
  - Mimi Kaplan, CMRPC
- Profile of Natural Hazards
  - Andrew Loew, CMRPC

10am – 12pm

- Breakout Groups – Identify Hazards, Local Features, Strengths & Vulnerabilities

12pm -1pm Lunch Break

1pm – 4:30pm:

- Afternoon Overview – Peter Peloquin, CMRPC
- Breakout Groups – Identify & Prioritize Actions
- Table Reports and priority vote
- Closing Remarks and Wrap up



Thank you for participating in Dudley's Community Resilience Building Workshop!



# DUDLEY FIRE CHIEF KOCHANOWSKI



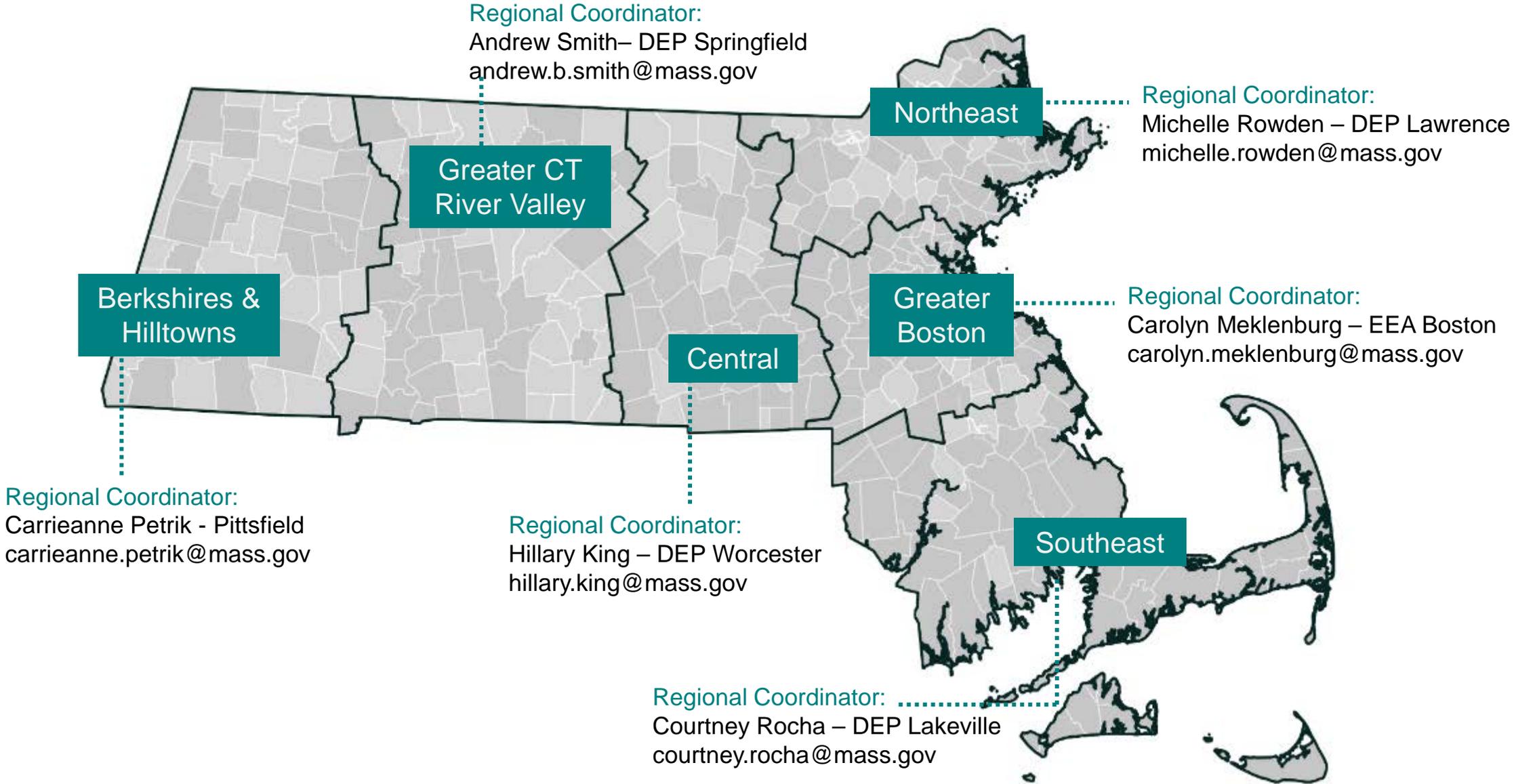


# Municipal Vulnerability Preparedness Program



Hillary King,  
MVP Central Regional Coordinator  
MA Executive Office of Energy and Environmental Affairs

# MVP Regions & Regional Coordinators



# Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) - September 2018



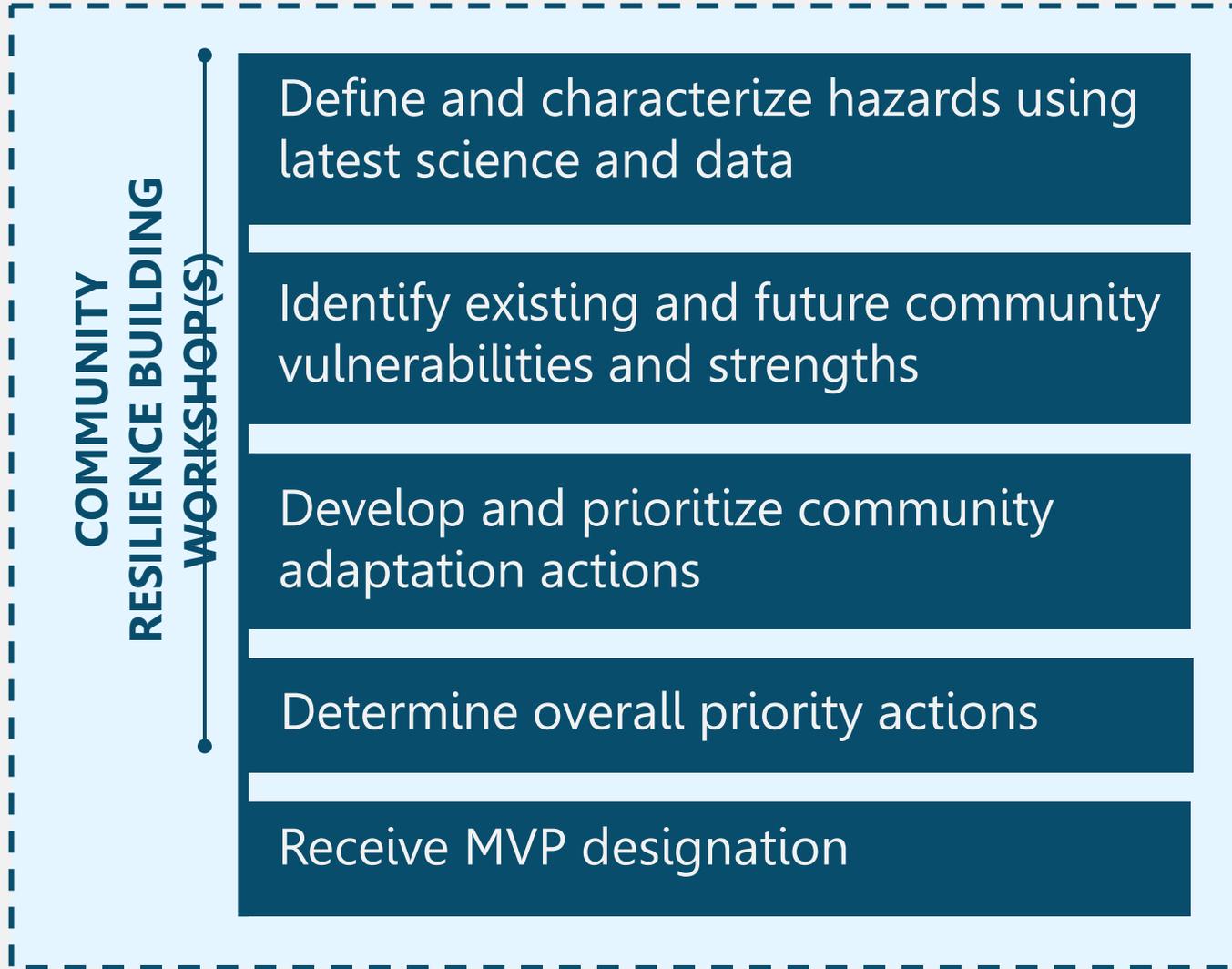
- Acknowledges that climate change is already worsening natural hazards, **integrating information and planning elements** for 14 natural hazards that affect the Commonwealth
- Uses **best scientific data and projections** to assess risk and vulnerability
- Evaluates the Commonwealth's existing capabilities to implement **agency-specific and statewide activities** to reduce risk and increase resilience

# MVP Principles

A community-led, accessible process that

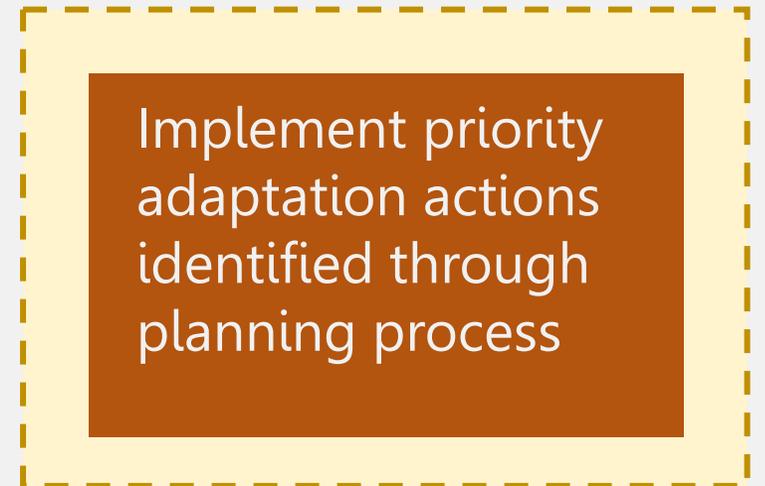
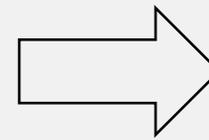
- Employs **local knowledge** and buy-in
- Utilizes **partnerships** and leverages existing efforts
- Is based in **best available climate projections** and data
- Incorporates principles of **nature-based solutions**
- Demonstrates **pilot potential** and is **proactive**
- Reaches and responds to risks faced by **EJ communities** and **vulnerable populations**

# MVP Process/ Grant Types



MVP  
Planning  
Grant

MVP Action Grant



# Three Years of MVP

## MVP Designations

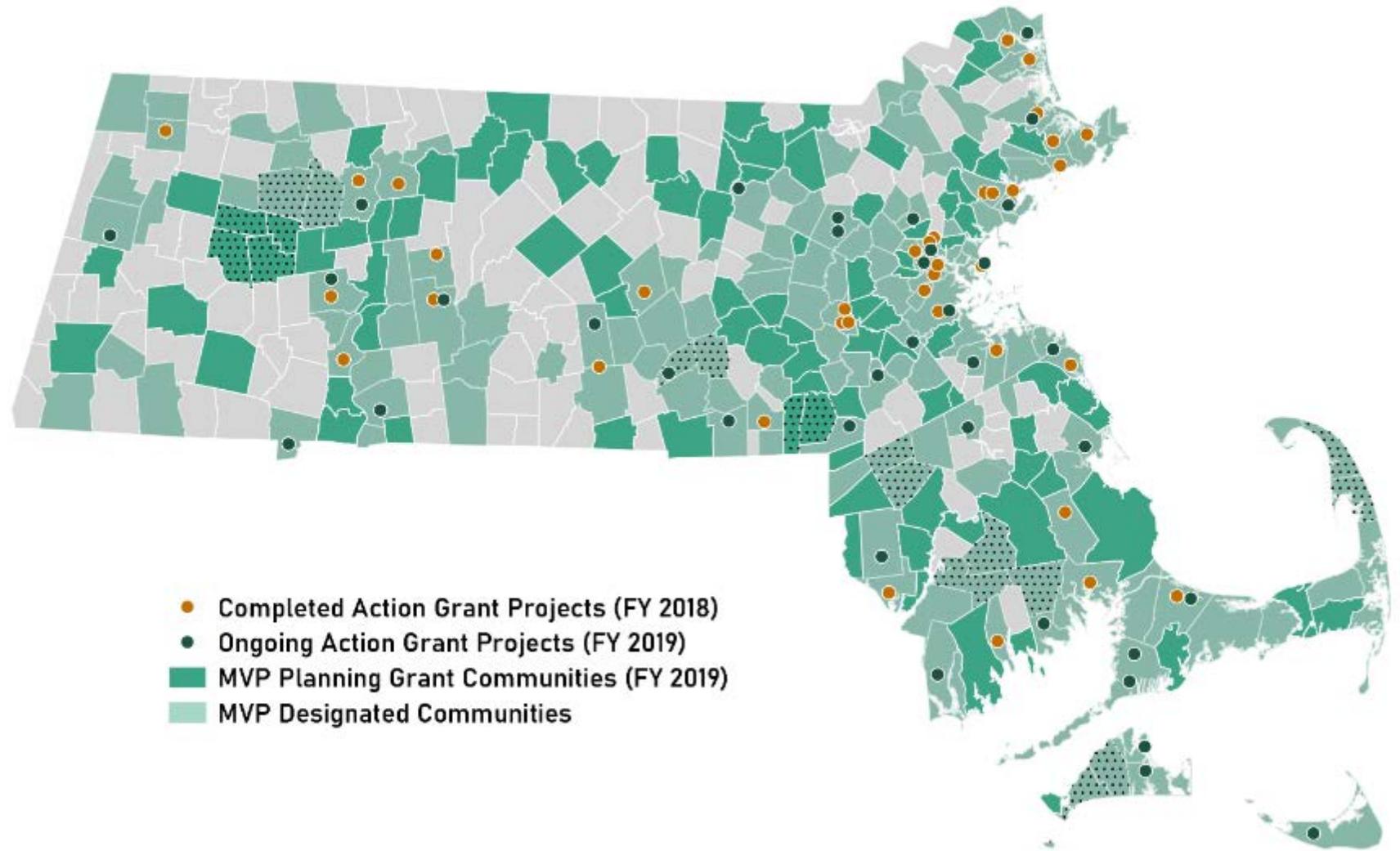
71% of the  
Commonwealth  
249 communities

## Action Grant Projects

FY 18: 37  
FY 19: 36

## Total Awards

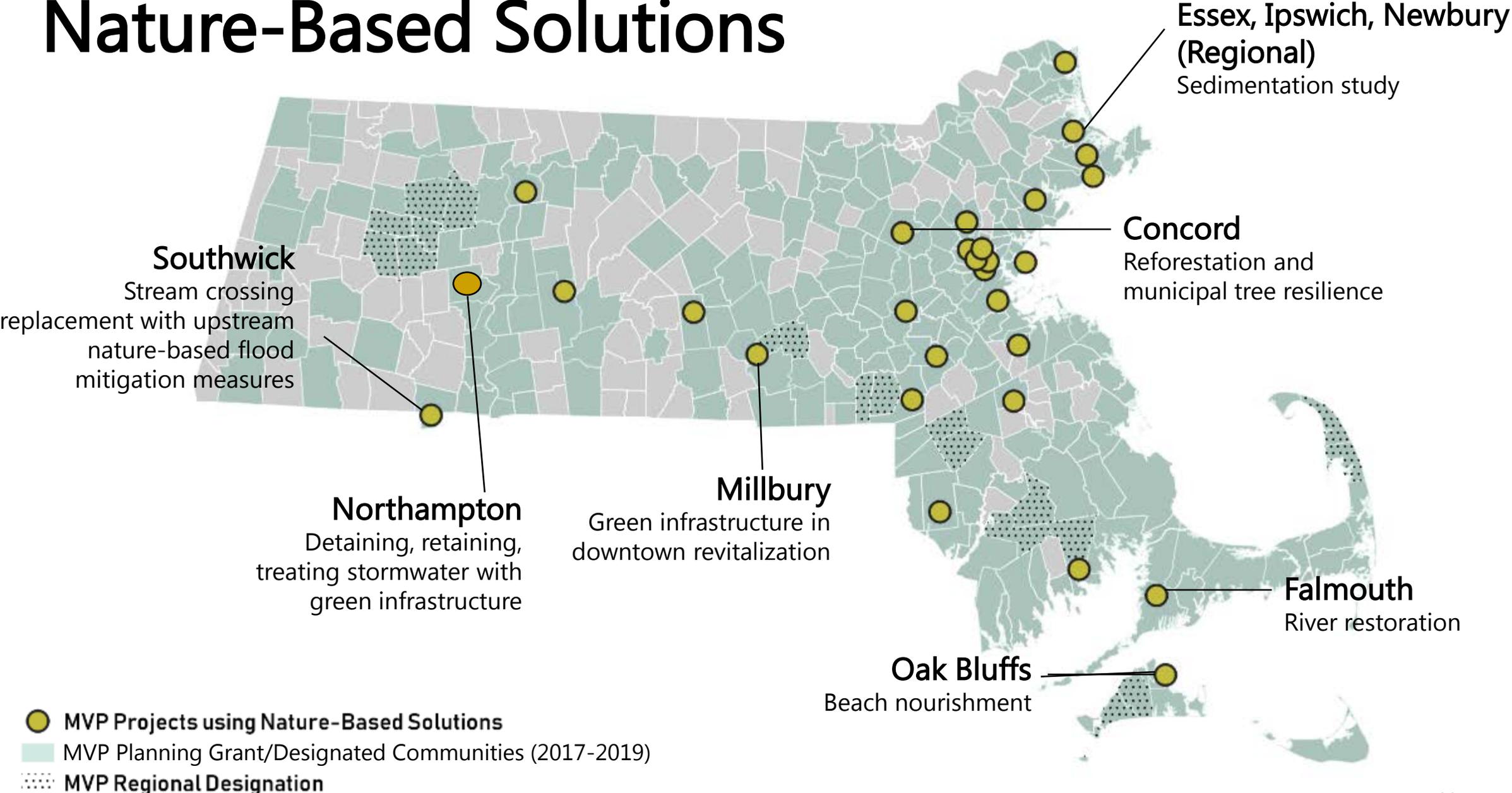
\$17M+ in planning and  
action grants to date



# MVP Action Grants: Project Types

- **Planning and Studies:**
  - Vulnerability and Risk Assessment
  - Community Outreach and Education
  - Local Bylaws, Ordinances, Plans, and Other Management Measures
- **Redesigns and Retrofits:**
  - Flood Protection
  - Energy Resilience
  - Chemical Safety
  - Subsidized Low-Income Housing
- **Nature-Based Solutions:**
  - Land Acquisition (e.g. for flood protection/ecological restoration, or park creation)
  - Green Infrastructure (e.g. for water quality and infiltration improvement)
  - Tree Planting, Pavement Removal (e.g. to reduce vulnerability to extreme heat and poor air quality)
  - Ecological Restoration and Habitat Management (e.g. dam removal, controlled burns, soil stabilization)

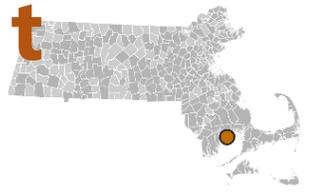
# Nature-Based Solutions



# Example Action Grant Projects

Land Acquisition for Resilience

## Mattapoiset



Purchasing 120 acres of forest, streams, freshwater wetlands and coastal salt marsh as conservation land to prevent development in vulnerable areas



**Data utilization**

**Proactive**

# Example Action Grant Projects

Nature-Based Flood Protection, Drought Prevention, Water Quality, and Water Infiltration Techniques

## Millbury



Utilizing **green infrastructure** like stormwater planters, bioretention bump outs, rain gardens, and other measures like porous pavers and pervious pavement **to reduce heat island effects and stormwater runoff** into the Blackstone River.

**Nature-based solutions**



# Example Action Grant Projects

Local Bylaws, Ordinances, Plans, and Other Management Measures

Redesigns and Retrofits

## Boston



Developing its **first ever resilient building code** so that development in the future floodplain is prepared for at **least three feet of sea level rise**, the likely scenario by late century.

**Retrofitting a major waterfront park** into a legacy park that uses **nature-based solutions** to address climate vulnerabilities while providing important access to recreation for residents.

Proactive

Pilot potential



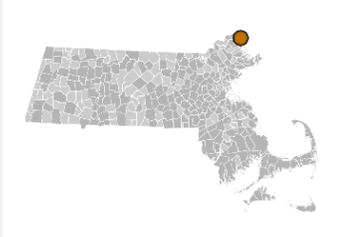
Nature-based solutions  
Community co-benefits



# Example Action Grant Projects

Redesigns and Retrofits

## Salisbury



Increasing the resilience of the neighborhood of Ring's Island by **raising its access/egress roads** and by improving tidal flushing through **culvert replacements**



**Vulnerable communities**

# Example Action Grant Projects

Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques

## Belchertown



Designing and permitting for a **replacement water storage tank** that would increase storage capacity and resiliency to drought, and completing a **feasibility/ concept design of a rainwater harvesting system** at Belchertown High School to irrigate the athletic fields.



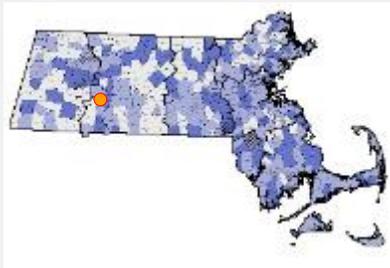
Nature-based solutions

Pilot potential

# FY18 Action Grant Projects

Detailed Vulnerability and Risk Assessment, Further Planning

## Holyoke

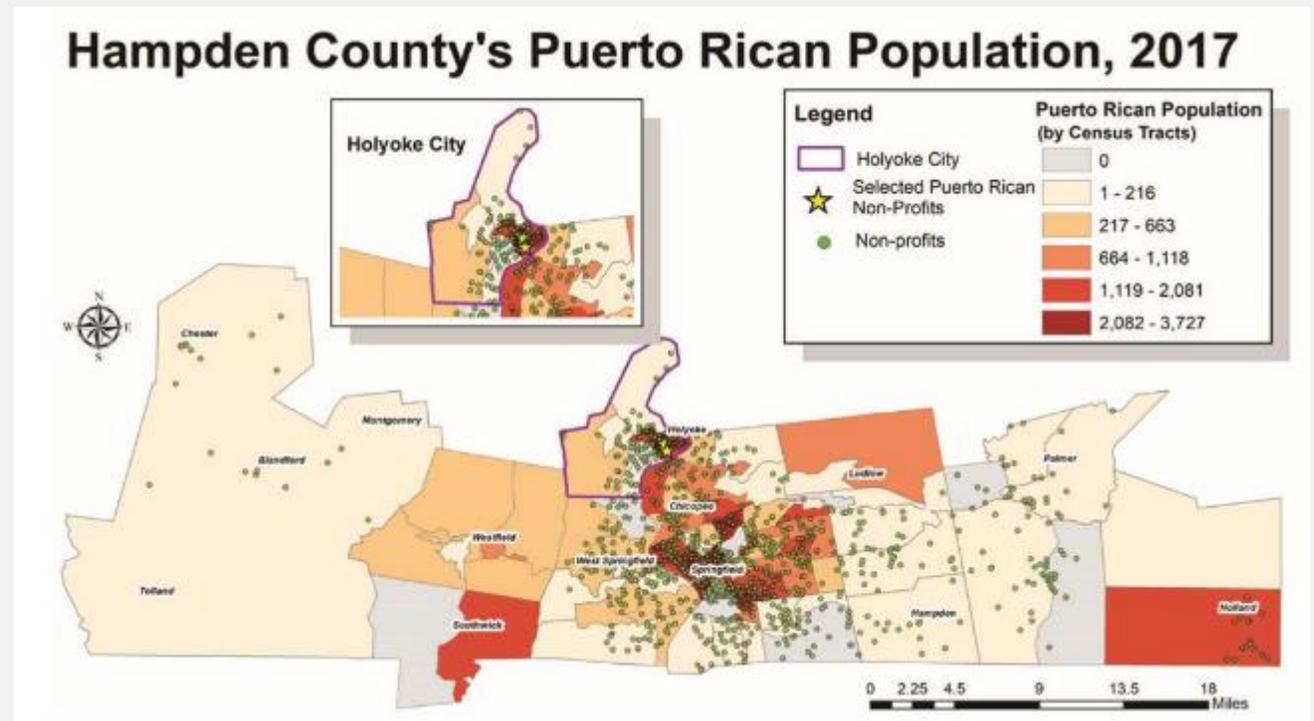


Conducted a detailed **demographic analysis** of individuals who arrived in Holyoke from Puerto Rico as a result of Hurricane Maria and develop recommendations for **planning for future climate change migrants** in Holyoke

Informational graphics from Holyoke's final report

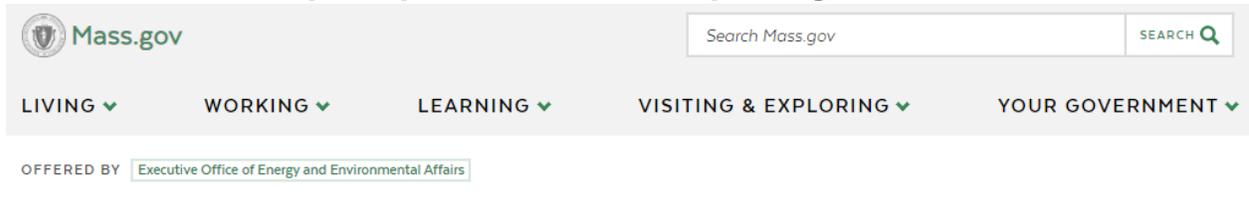
Table 12

How did the Holyoke municipal government respond to your needs? Was the response...	Freq.	Percent
Helpful	26	63.4
I don't know	7	17.1
Neither helpful nor unhelpful	2	4.9
There was no response from this resource	6	14.6
<b>Total</b>	<b>41</b>	<b>100</b>



# MVP Resources

[mass.gov/municipal-vulnerability-preparedness-program](https://mass.gov/municipal-vulnerability-preparedness-program)



## Municipal Vulnerability Preparedness Program Action Grant Projects

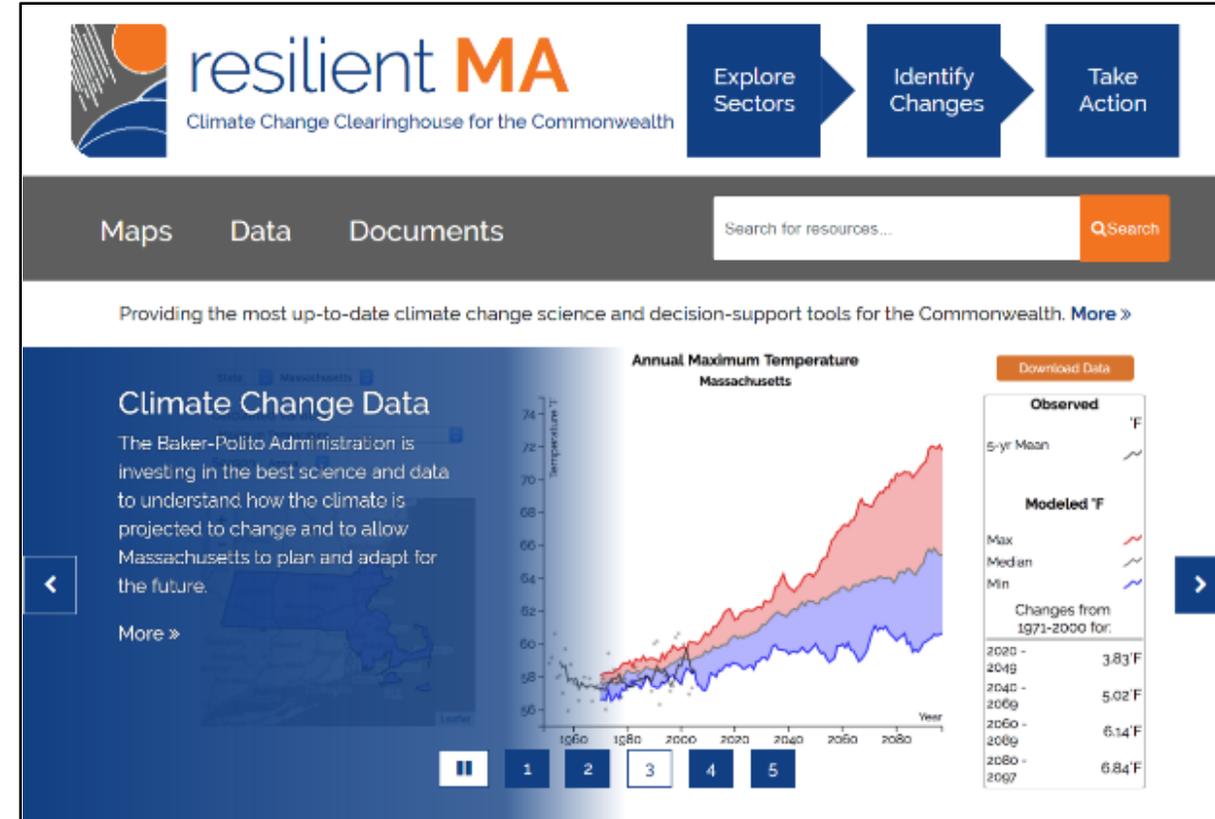
Find a summary of all FY18 action grant projects as well as detailed deliverables below.

[FY18 MVP Action Grant Summary](#)

### TABLE OF CONTENTS

- Adams
- Arlington
- Belchertown
- Boston
- Brookline
- Cambridge
- Carver
- Charlton & Spencer
- Deerfield

[resilientma.org](https://resilientma.org)



Climate Change Data

The Baker-Polito Administration is investing in the best science and data to understand how the climate is projected to change and to allow Massachusetts to plan and adapt for the future.

More »

Annual Maximum Temperature Massachusetts

Year	Change from 1971-2000 (F)
2020 - 2049	3.83 F
2040 - 2069	5.02 F
2060 - 2089	6.14 F
2080 - 2097	6.84 F



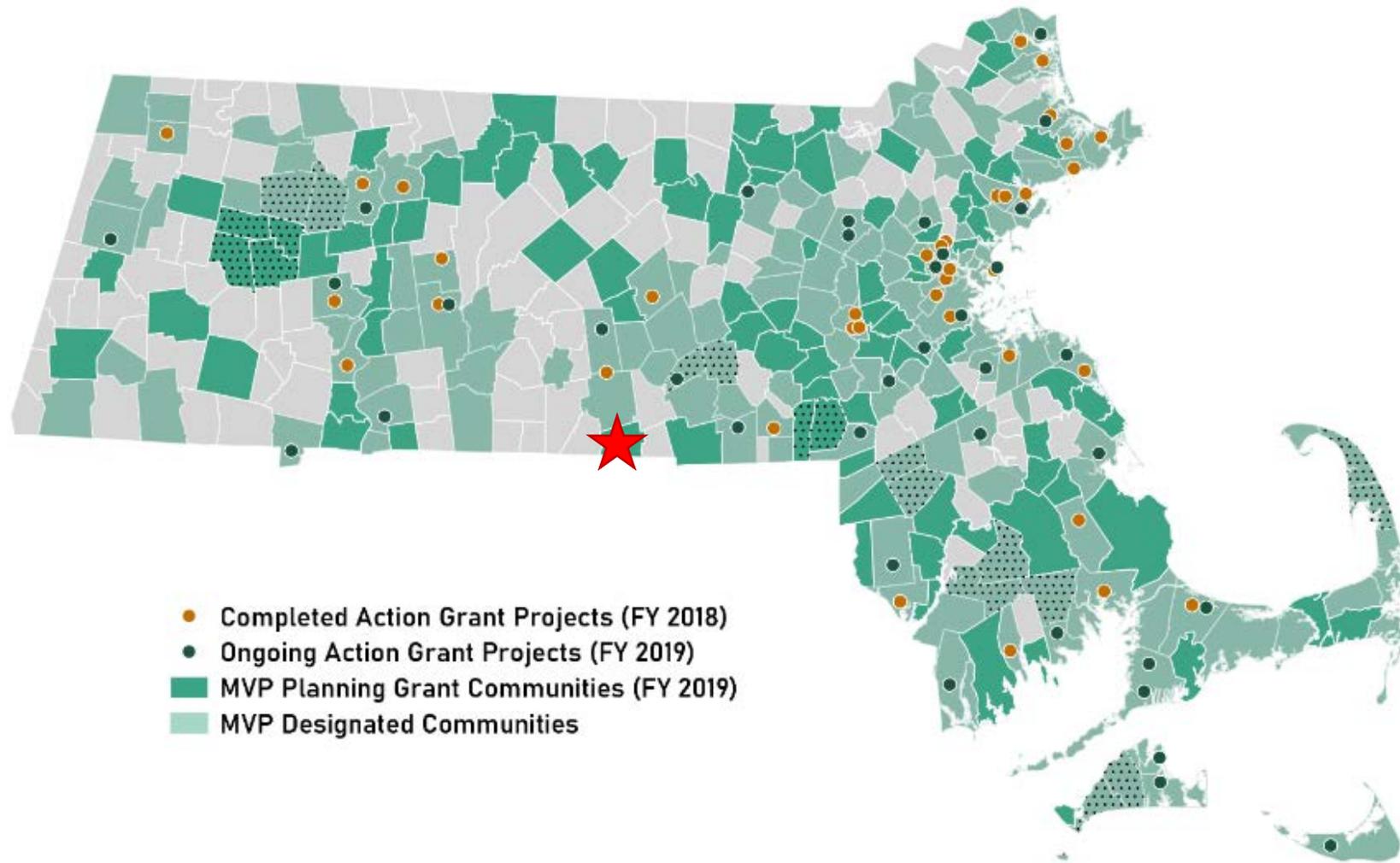
**hillary.king@mass.gov**

**<https://www.mass.gov/municipal-vulnerability-preparedness-program>**

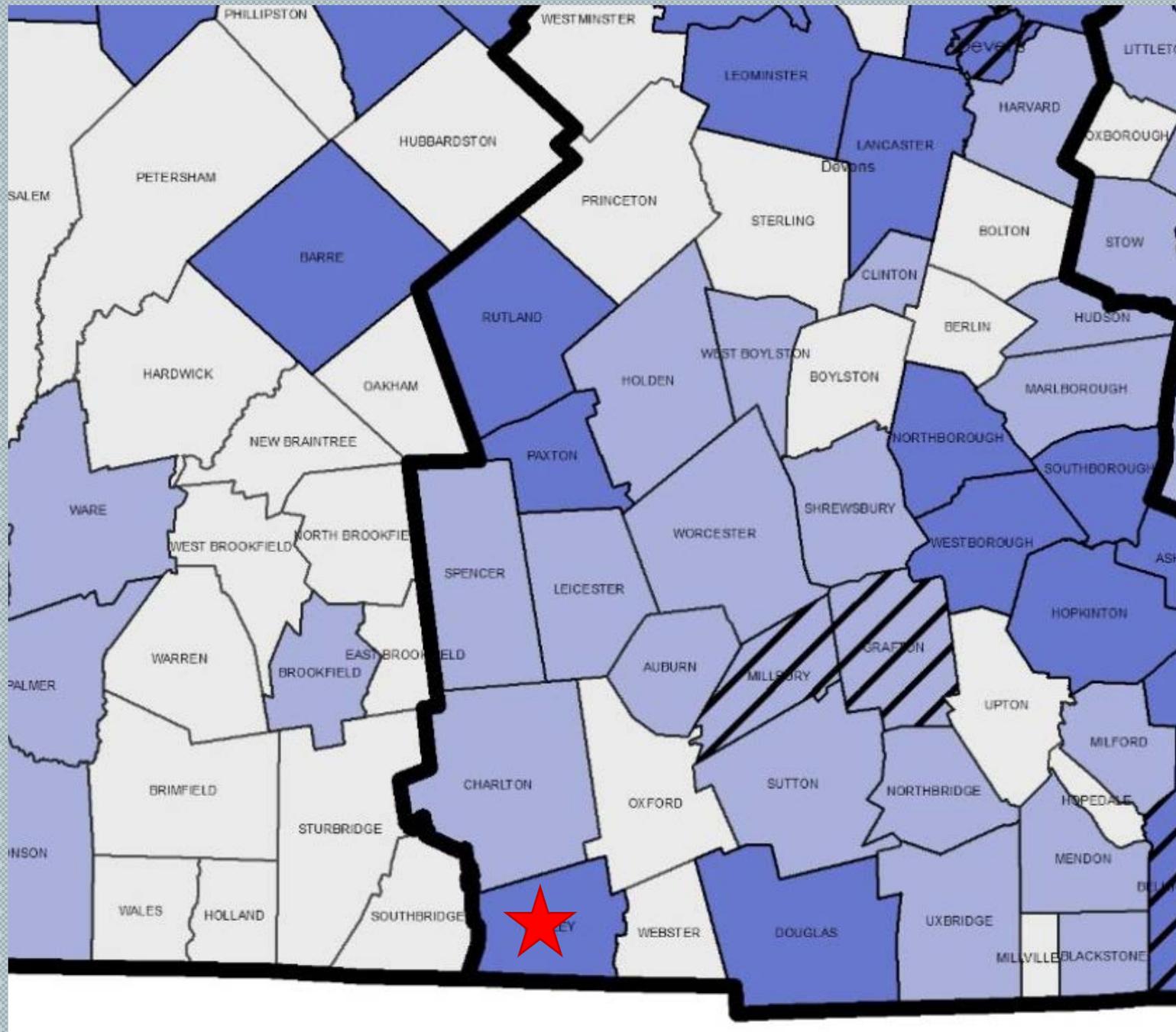


# COMMUNITY RESILIENCE BUILDING WORKSHOP OBJECTIVES

- Define extreme weather and climate-related hazards
- Identify current and future vulnerabilities and strengths
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience



- Completed Action Grant Projects (FY 2018)
- Ongoing Action Grant Projects (FY 2019)
- MVP Planning Grant Communities (FY 2019)
- MVP Designated Communities



# HOW THE TOWN GOT HERE?

- Awarded Planning Grant
- 5 Core Team Meetings
- Invitation from Core Team



**I. Engage  
Community**

**2. Identify CC  
Impacts &  
Hazards**

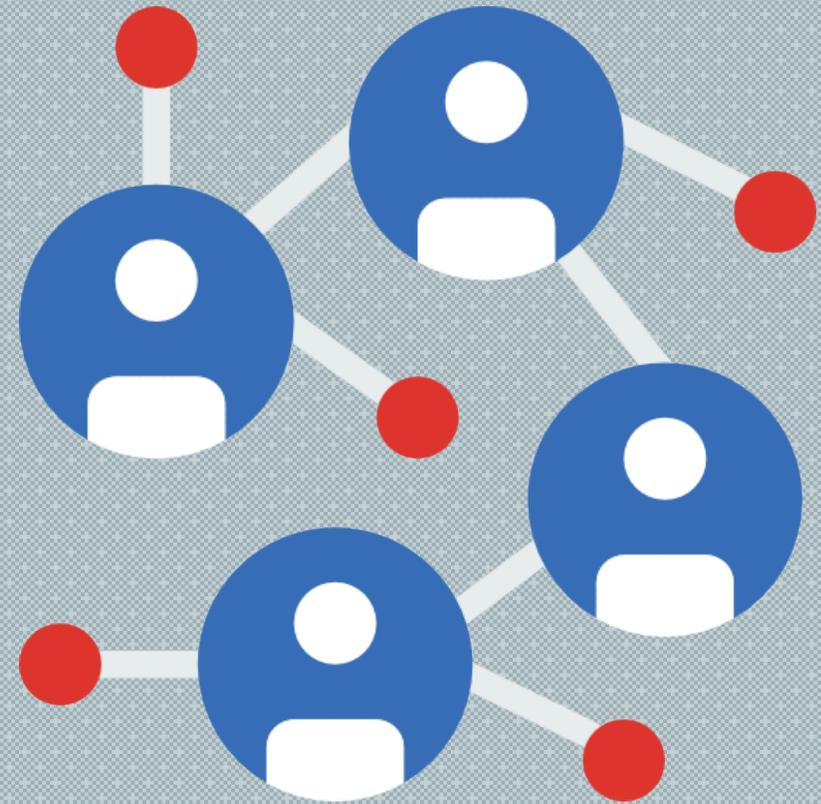
**3. Complete  
Assessment of  
Vulnerabilities  
& Strengths**

**4. Develop &  
Prioritize  
Actions**

**5. Take Action**

# BREAKOUT GROUPS

- 5 tables of 5 to 6 individuals
- Each table will discuss
  - Societal,
  - Infrastructure, and
  - Environmental
- Tools and Resources
  - Matrix, Maps, Markers, Dots, & Each Other



## TABLE ROLES AND RESPONSIBILITIES

- Table Facilitator directs the discussion and keeps the dialogue moving
- Scribes filling in matrix
- Participants- All of you
- CMRPC resource person
- Table spokesperson for Report Out

# CLIMATE PROJECTIONS AND IMPACTS

1. Engage  
Community

2. Identify CC  
Impacts &  
Hazards

3. Complete  
Assessment of  
Vulnerabilities  
& Strengths

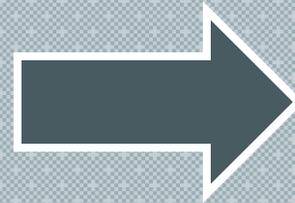
4. Develop &  
Prioritize  
Actions

5. Take Action

# CLIMATE CHANGE PROJECTIONS

## Climate projections

- Precipitation
  - Annual
  - Large events
  - Changes in “\_\_\_ year storms”
- Temperature
  - Consecutive dry days



## Natural Hazards

- Winter Storms
- Heavy Rainfall and Flooding
- Drought, Wildfire, and Heat

# OUR CLIMATE IS ALREADY CHANGING

**Temperature:**



**1.8° F  
Since 1895**

**Growing Season:**



**11 Days  
Since 1895**

**Sea Level Rise:**



**8 inches  
Since 1922**

**Strong Storms:**



**55%  
Since 1958**

# EXAMPLES OF IMPACTS OF CLIMATE CHANGE

- **Agriculture**

Impact on crops from more extreme temperature and precipitation

- **Ecosystems**

Impacts such as range shifts, habitat loss, and more invasive species.

- **Energy**

Increase in summer peak electricity demand in most regions of the United States.

- **Human Health**

More frequent, extreme and longer heat waves will impact vulnerable populations.

- **Transportation**

Increased precipitation and flooding can impact traffic and construction, and weaken or wash out soil and culverts that support roads, tunnels, and bridges.

# NORTHEAST CLIMATE SCIENCE CENTER UMASS AMHERST



- NECASC downscaled climate projections for major drainage basins
- Climate Models from the IPCC Fifth Assessment Report
- Historical Data 1971-2000
- Medium and High Emission Scenarios were Chosen (RCP 4.5 and 8.5)
  - Medium Scenario Assumes Emissions Peak at Mid-Century
  - High Scenario Assumes a Continuing Emission Trajectory

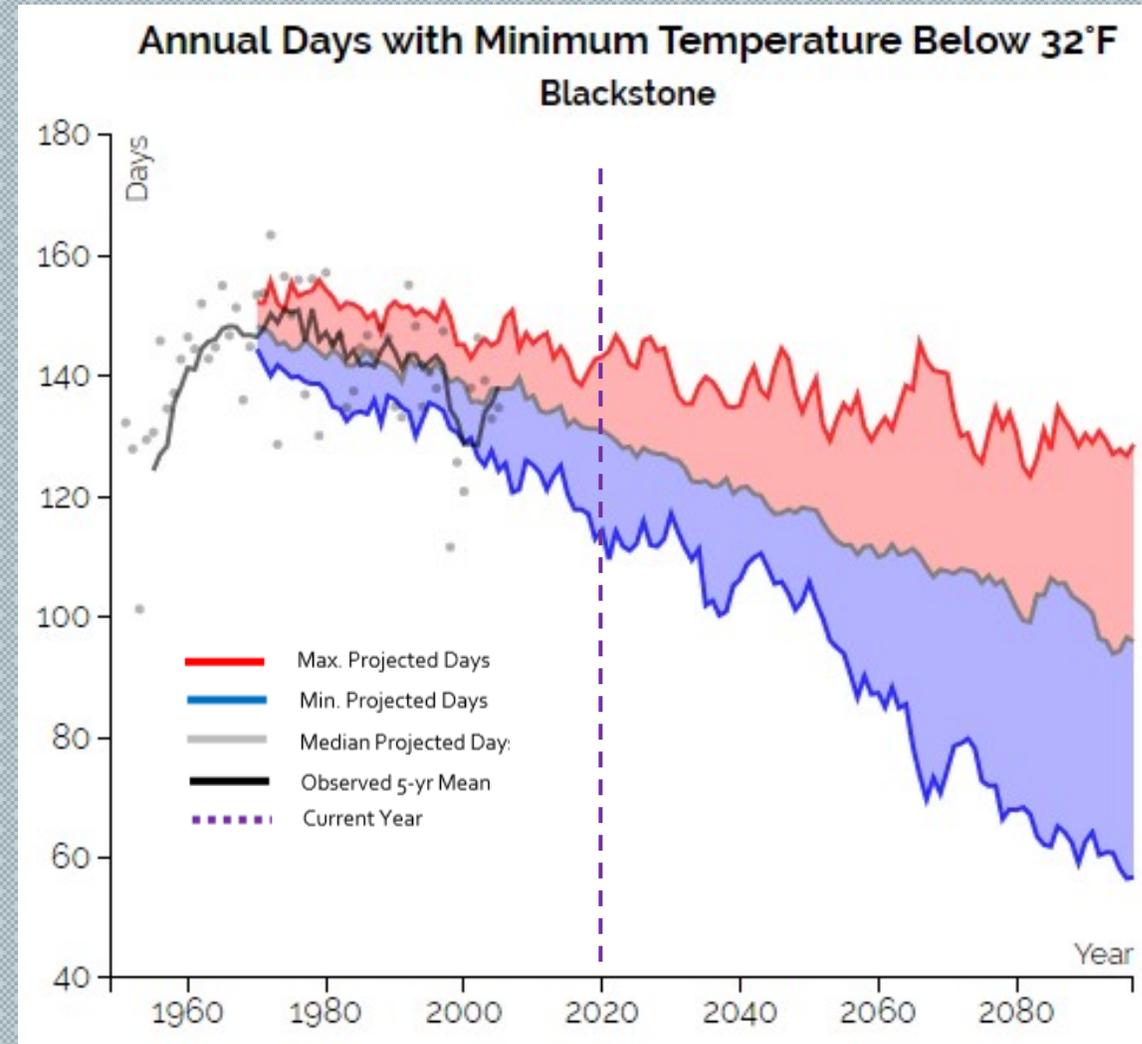


# QUINEBAUG & FRENCH RIVER BASIN



# WINTER STORMS

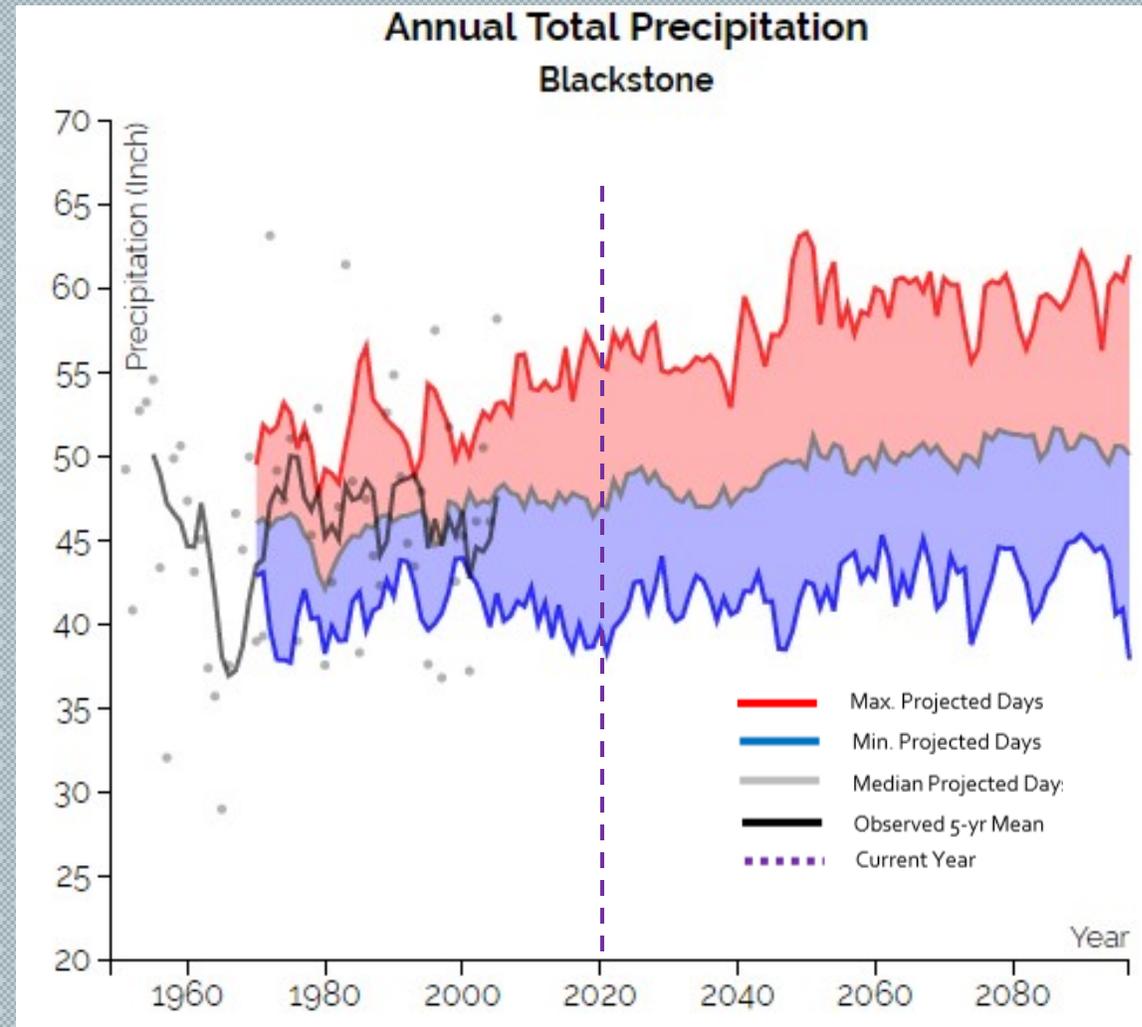
- Annual days below freezing will decrease
- Rising temps → more winter precipitation to fall as rain or freezing rain
- Lower snowfall accumulation
- Winter - Highest projected increase in precipitation
- Storms that do occur may be worse - proximity to Atlantic Ocean increases risk of large storm events



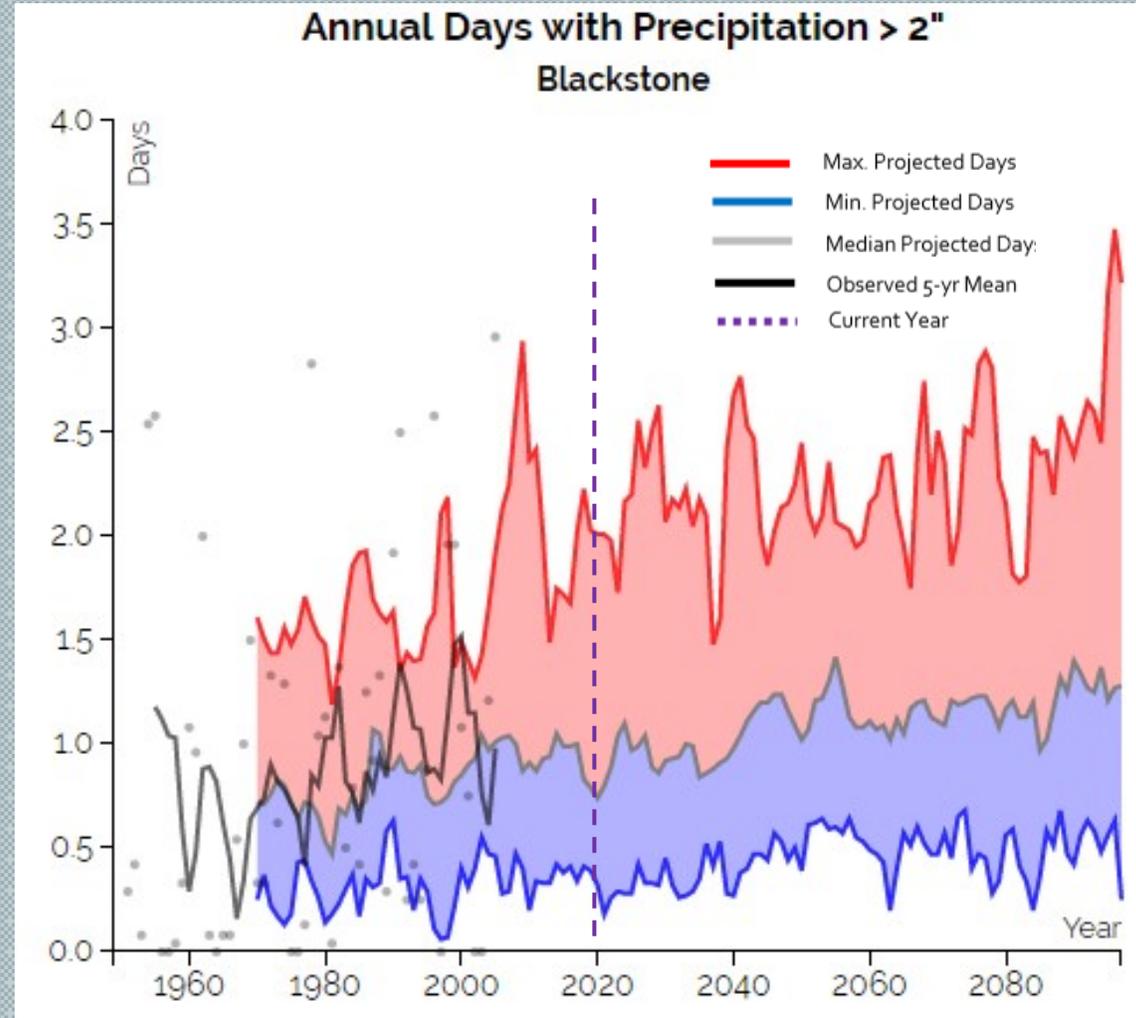
# HEAVY RAINFALL AND FLOODING

## Seasonal

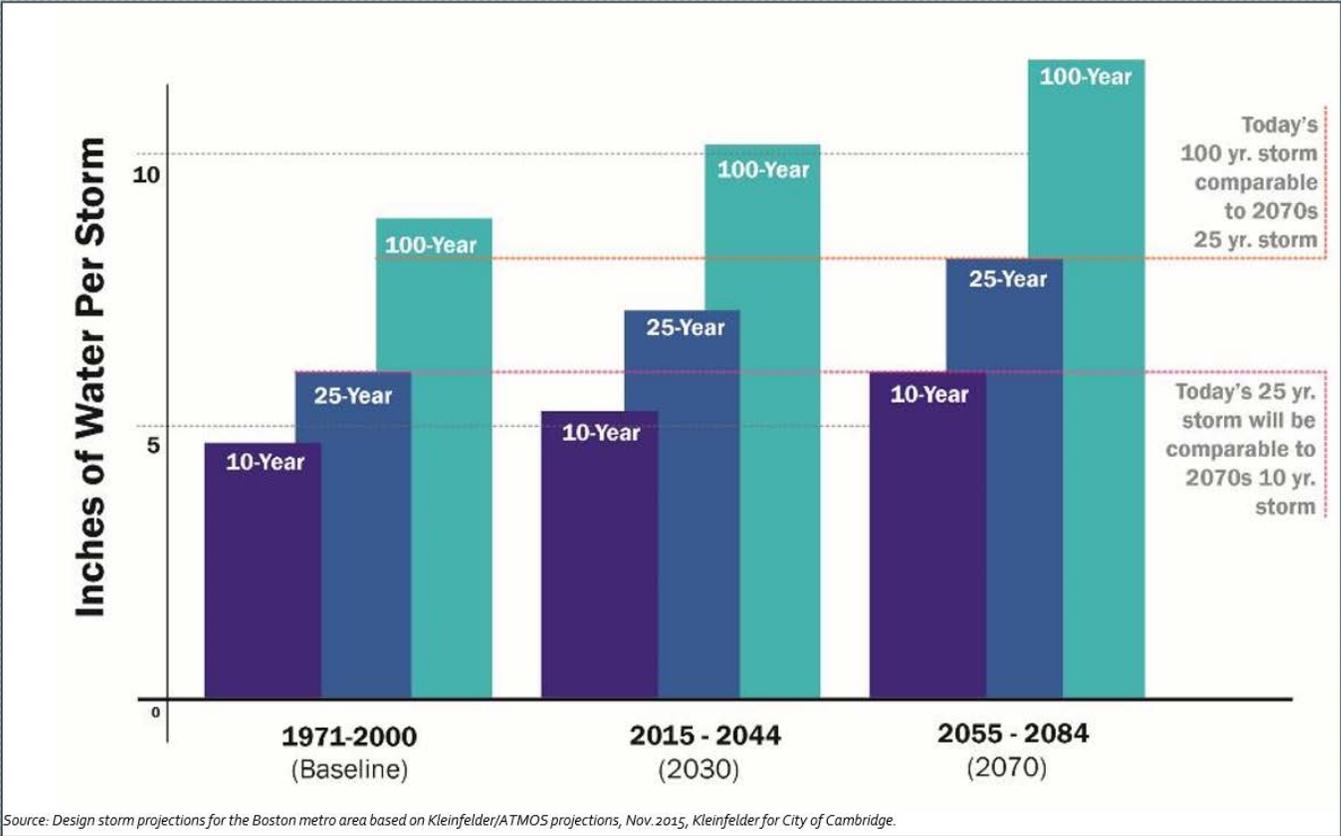
- **Winter** – Largest increase expected, up to .6 to 3.9 inches by end of century
- **Spring** – Expected increase of .2 to 2.8 inches by end of century
- **Summer** – Possible decrease of 1.2 inches to increase of 2.0 inches by end of century
- **Fall** – Possible decrease of 1.7 inches to increase of 1.5 inches by end of century



# HEAVY RAINFALL AND FLOODING



# HEAVY RAINFALL AND FLOODING



Source: Design storm projections for the Boston metro area based on Kleinfelder/ATMOS projections, Nov. 2015, Kleinfelder for City of Cambridge.

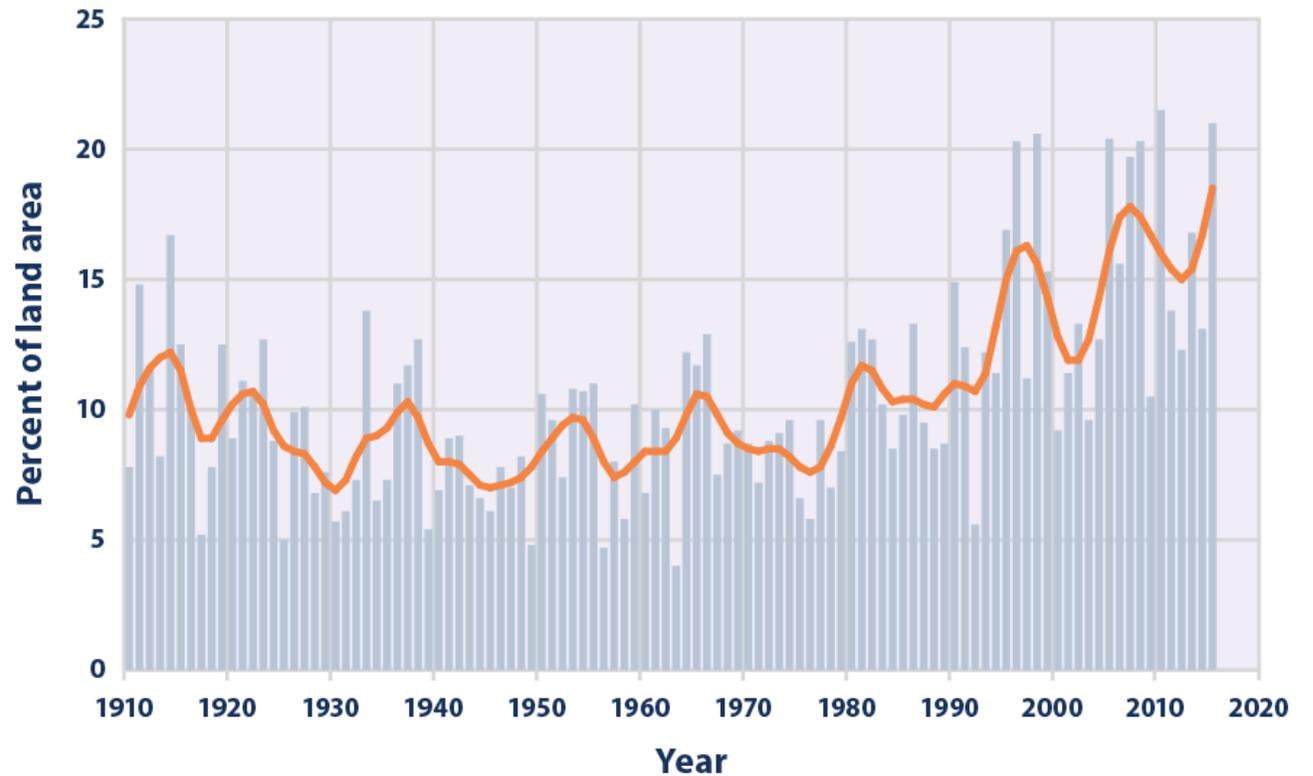


Icon made by photo3idea\_studio from Flaticon.com

# HEAVY RAINFALL AND FLOODING

- Precipitation will increase across all seasons
- Total annual rainfall will increase
- Heavy rainfall events will become more frequent
  - Overbank flooding from rainfall and snowmelt
  - Piped Infrastructure backup and or failure
- Water quality impact from flooding
  - Erosion
  - Nonpoint source pollution

Extreme One-Day Precipitation Events in the Contiguous 48 States, 1910–2015



Data source: NOAA (National Oceanic and Atmospheric Administration). 2016. U.S. Climate Extremes Index. Accessed January 2016. [www.ncdc.noaa.gov/extremes/cei](http://www.ncdc.noaa.gov/extremes/cei).

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at [www.epa.gov/climate-indicators](http://www.epa.gov/climate-indicators).

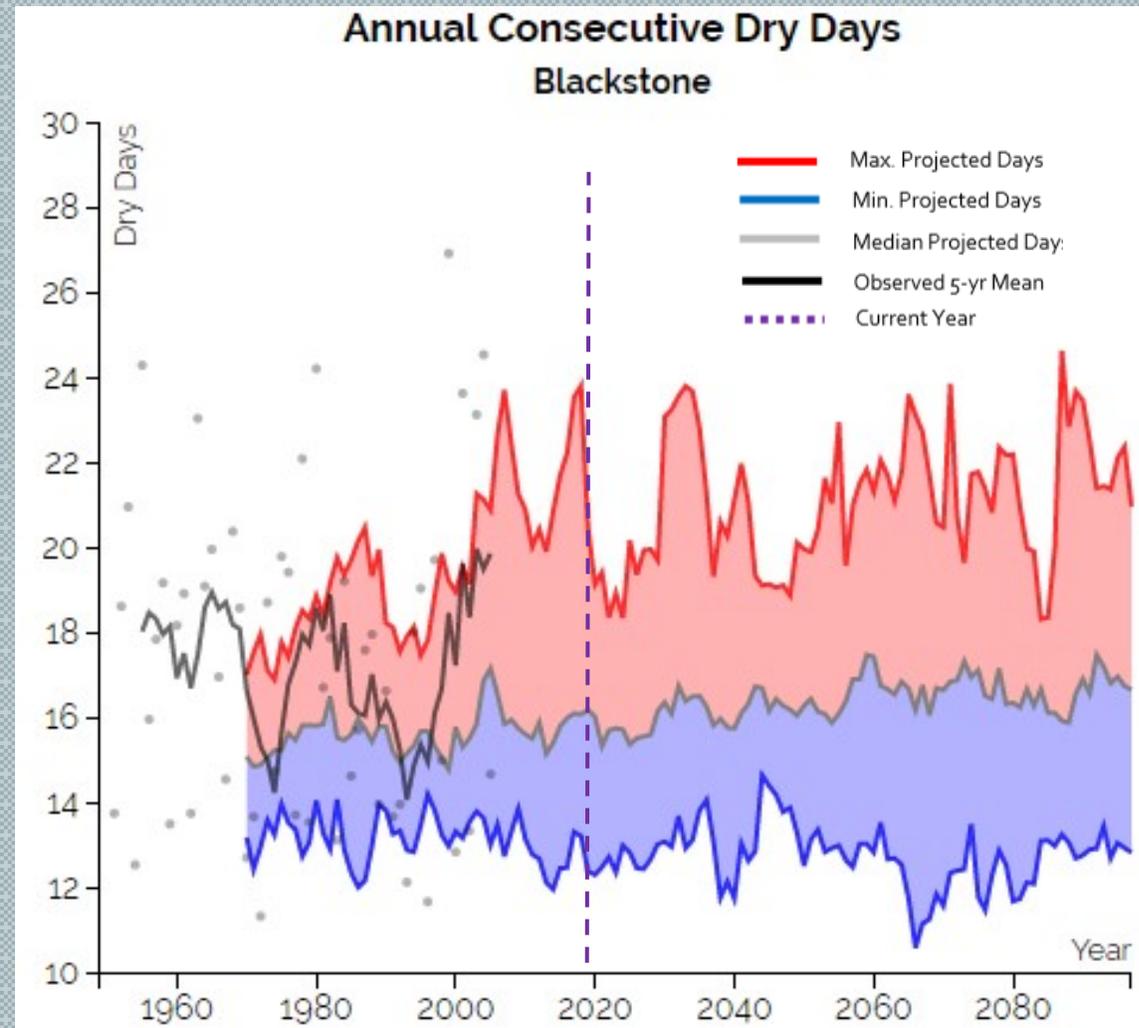
# IMPACTS OF INCREASED PRECIPITATION

- More disruptive flooding events, especially with undersize stormwater infrastructure
  - Increased inland flooding
  - Soils become saturated
  - River flows rise
  - Capacity of urban SW infrastructure is exceeded
  - Impacts to property and critical infrastructure
- Increased non-point source pollution
  - Ecological damage to nearby waterbodies



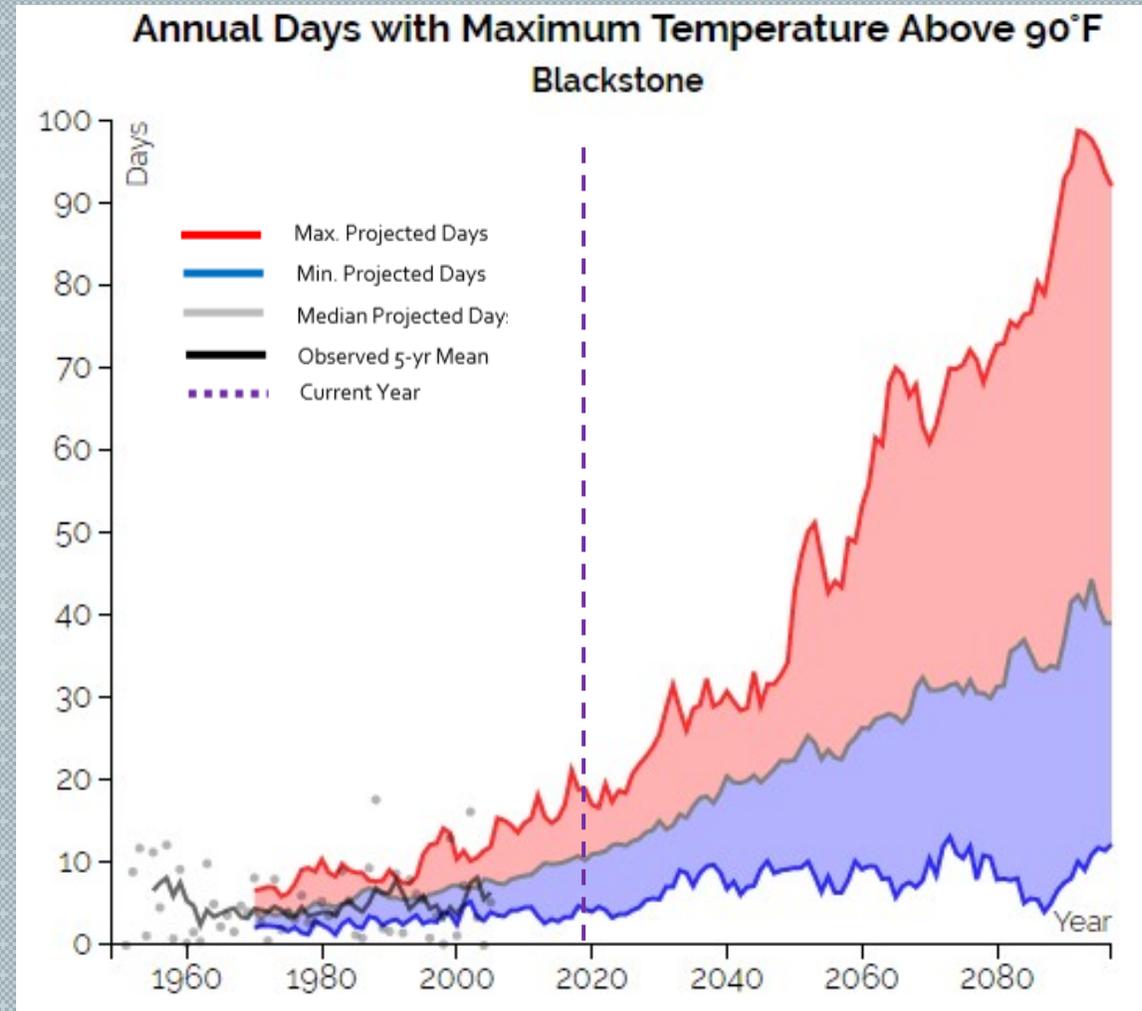
# DROUGHT IMPACTS

- More consecutive dry days
- Highest number of consecutive dry days in summer and fall.
- Increase of up to 3 additional consecutive dry days by the end of the century



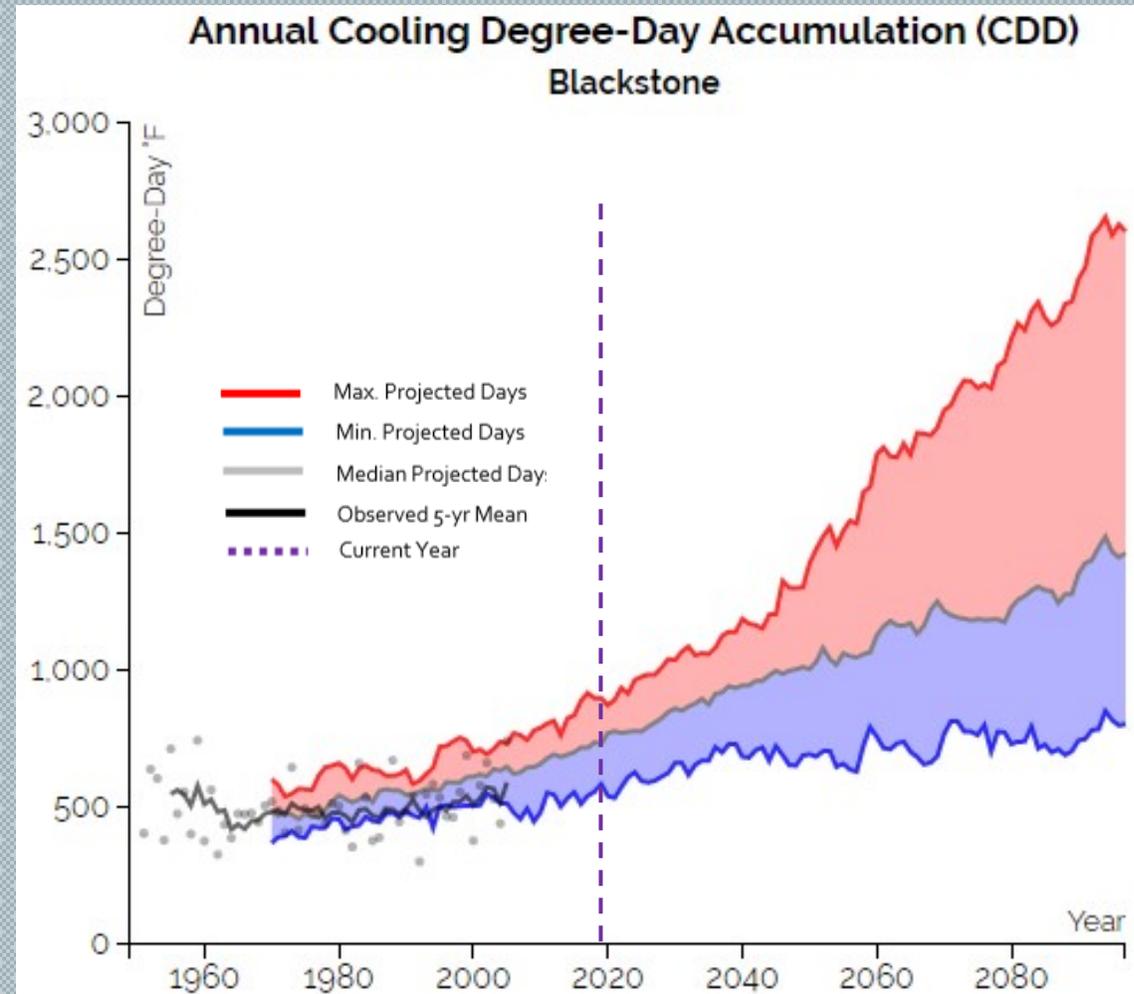
# HEAT PROJECTIONS

- Projected increase of 8 to 29 days annually over 90°F by mid century
- Projected increase of 11 to 69 days annually over 90°F by end of century



# HEAT PROJECTIONS

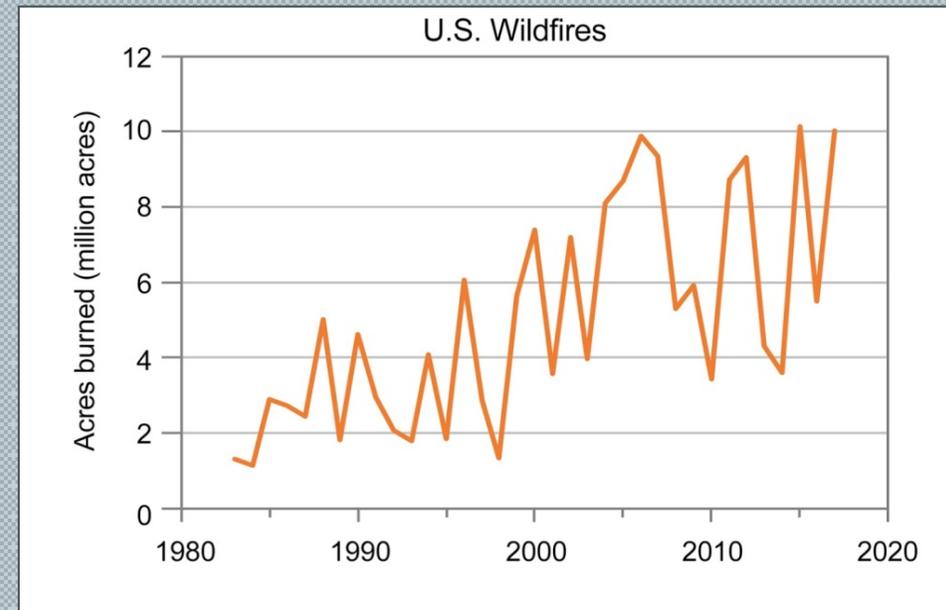
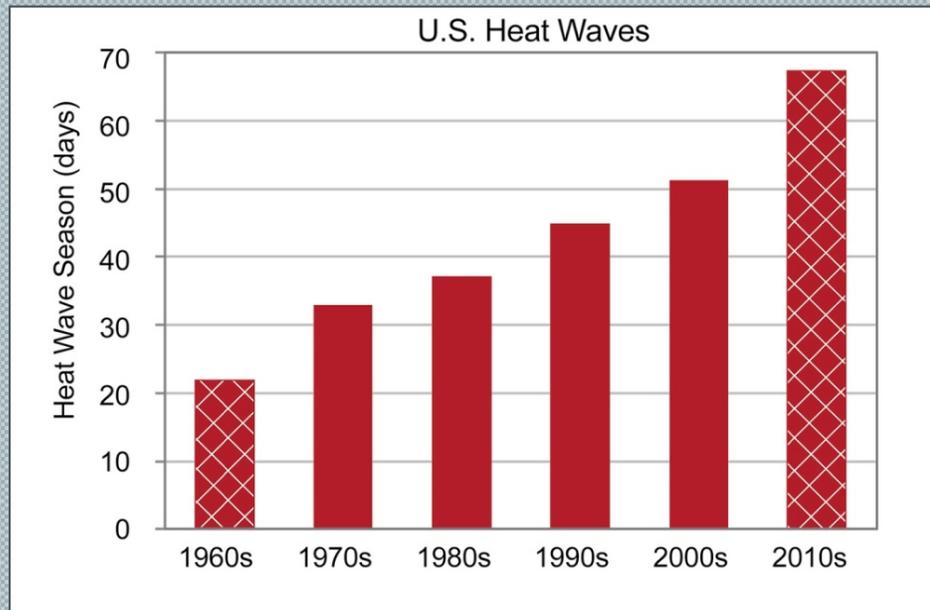
- Projected decrease in heating degree-days and increase in cooling-degree days
- More days above 65°F means fewer days needed to heat buildings and more days needed to cool buildings.
- Winter
  - 7-19% decrease in HDD by mid century
- Spring
  - 10-24% decrease in HDD by mid century
- Fall
  - 20-33% decrease in HDD by mid century



# HEAT AND WILDFIRE

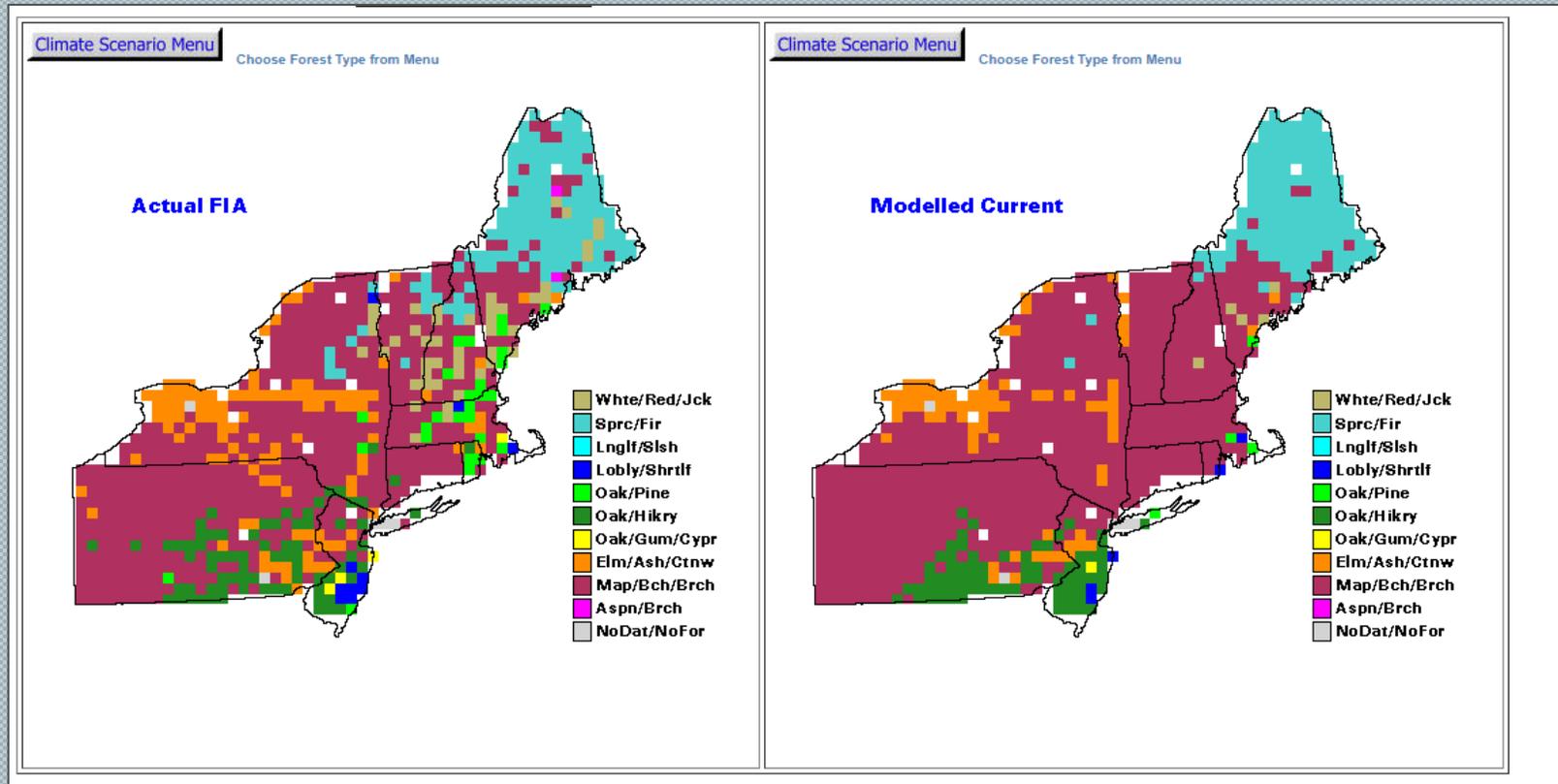
## Nation-Wide Data

As the number and length of heat waves increase, so will the incidence of wildfires.



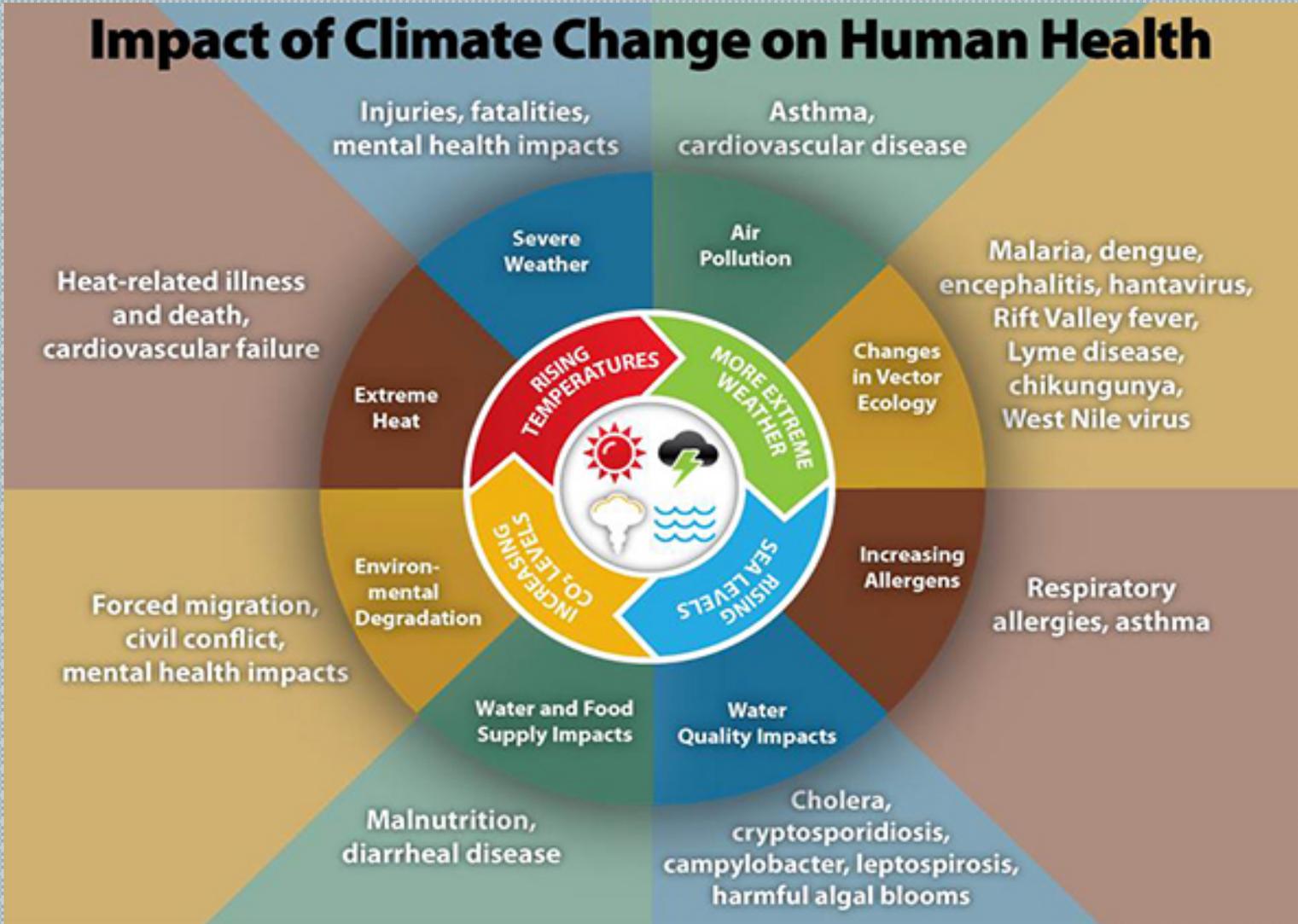
# HEAT IMPACTS ON THE ENVIRONMENT

- The ranges of some tree species are expected to move north, and the diversity of species will likely decrease
- Likely increase in invasive species



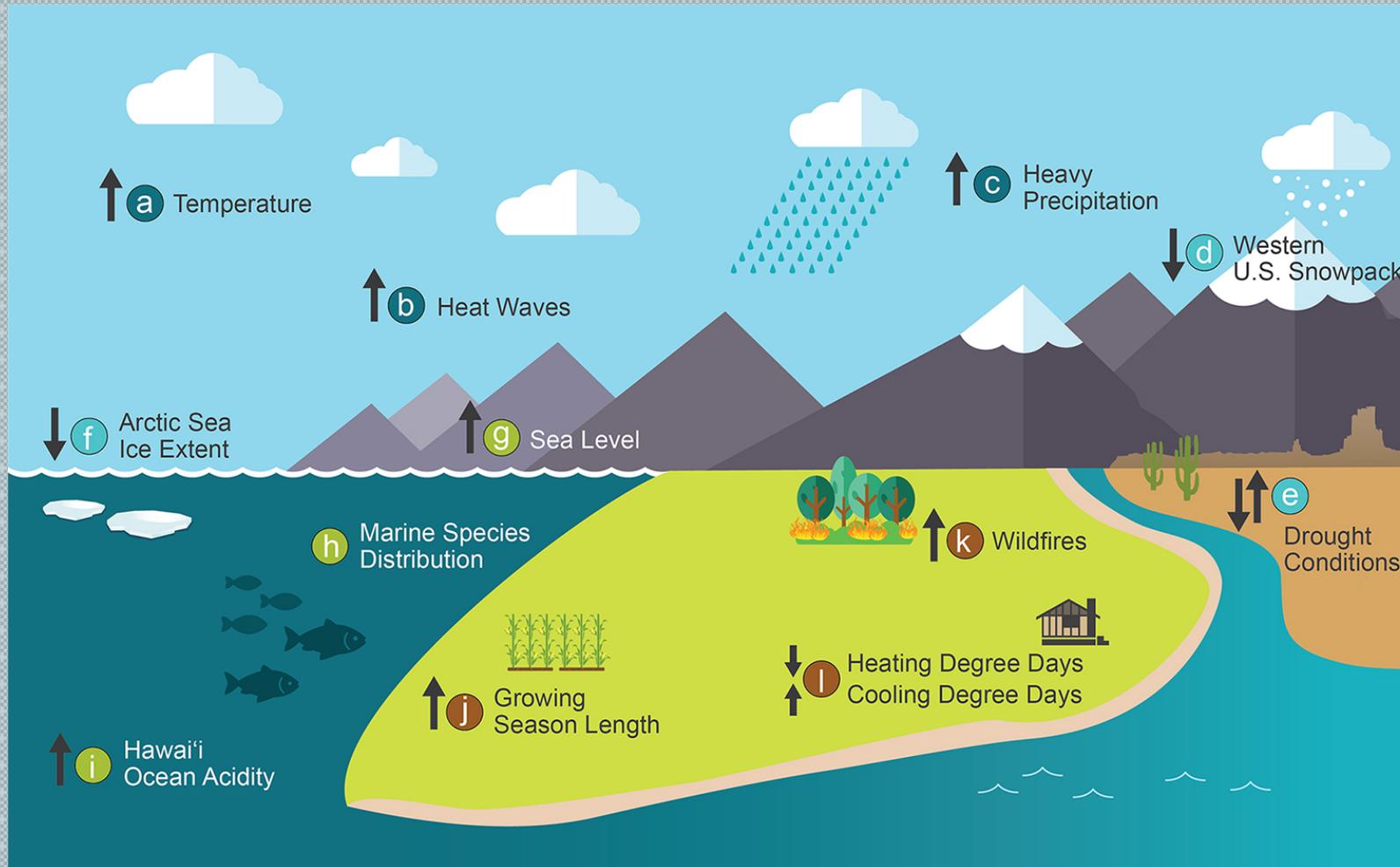
2100

# HEAT IMPACTS ON SOCIETY



<https://www.cdc.gov/climateandhealth/effects/default.htm>

# QUESTIONS?



# HAZARD MITIGATION PLANNING

- Overlaps somewhat with Hazard Mitigation Planning, but MVP is more focused on climate change in the long term
- Dudley's Hazard Mitigation received Final FEMA Approval in February 2019.
- 5-year plans



## Dudley Hazard Mitigation Plan Update *[Last Revised – February 26, 2019]*



Dudley MA, 2017

Adopted by the Board of Selectmen February 25, 2019

Prepared by the Central Massachusetts Regional Planning Commission  
1 Mercantile Street, Suite 520  
Worcester, MA 01608  
[www.cmrpc.org](http://www.cmrpc.org)

&

Local Hazard Mitigation Team  
Town of Dudley, Massachusetts



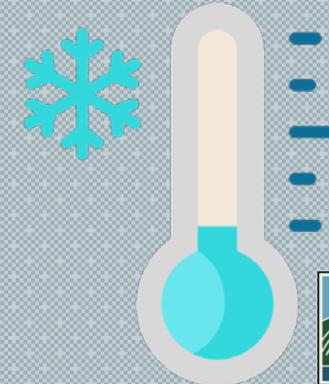
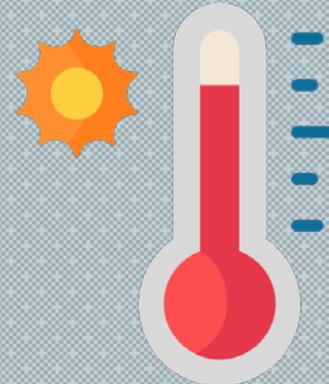
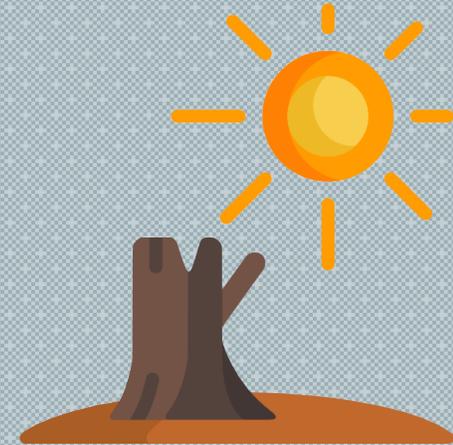
# BE PREPARED, MITIGATE THE COSTS

US Natural Disasters in 2017 cost \$306 Billion, the most expensive year since NOAA started keeping track in 1980

National Benefit-Cost Ratio Per Peril		Exceed common code requirements	Meet common code requirements	Utilities and transportation	Federally funded
<small>*BCR numbers in this study have been rounded</small>					
<b>Overall Hazard Benefit-Cost Ratio</b>		<b>4:1</b>	<b>11:1</b>	<b>4:1</b>	<b>6:1</b>
<b>Savings (\$billion)</b>		<b>\$16<sub>/year</sub></b>	<b>\$13<sub>/year</sub></b>	<b>\$2.5</b>	<b>\$160</b>
 <b>Riverine Flood</b>		5:1	6:1	8:1	7:1
 <b>Hurricane Surge</b>		7:1	Not applicable	Not applicable	Too few grants
 <b>Wind</b>		5:1	10:1	7:1	5:1
 <b>Earthquake</b>		4:1	12:1	3:1	3:1
 <b>Wildland-Urban Interface Fire</b>		4:1	Not applicable	Not applicable	3:1

# NATURAL HAZARDS

- Flooding (all types)
- Droughts and wildfires
- Winter storms
- Severe thunderstorms
- Hurricanes
- Wind and tornadoes
- Extreme temperatures
- Landslides
- Earthquakes



# FLOOD RISKS



Quinebaug River, Putnam, Conn., 1955

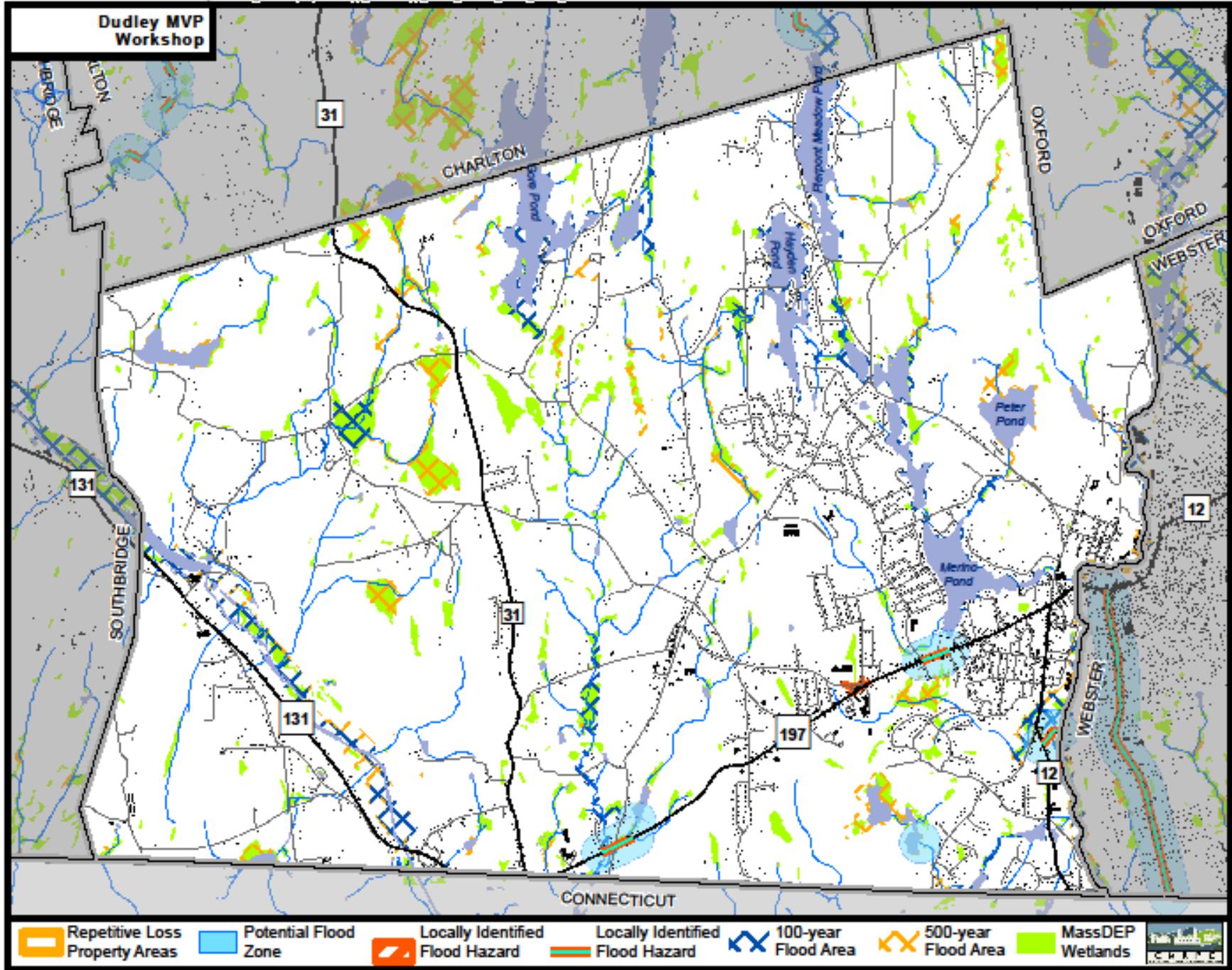


French River, Oxford, 1955



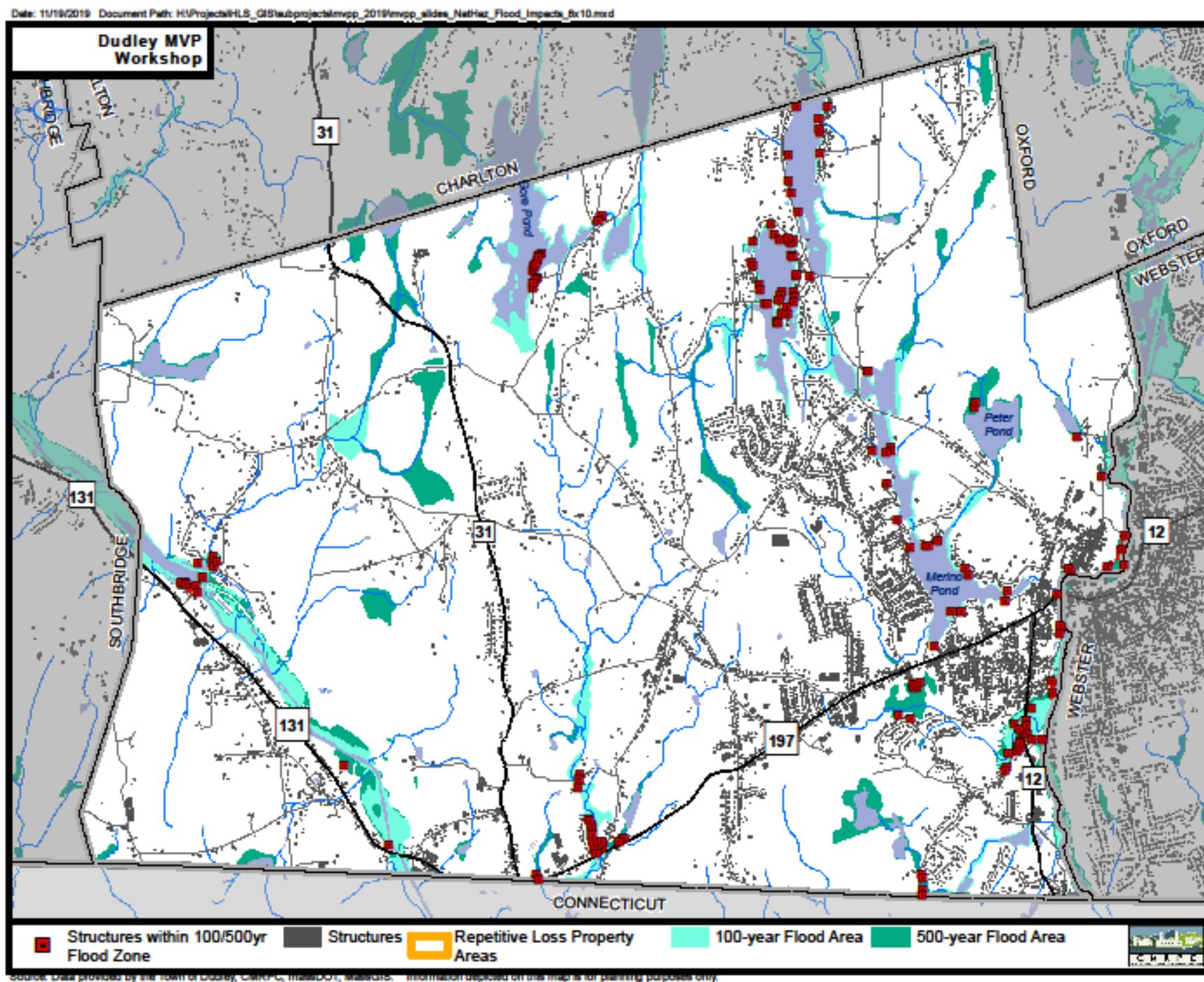
West Main Street, 2017

# FLOOD RISKS

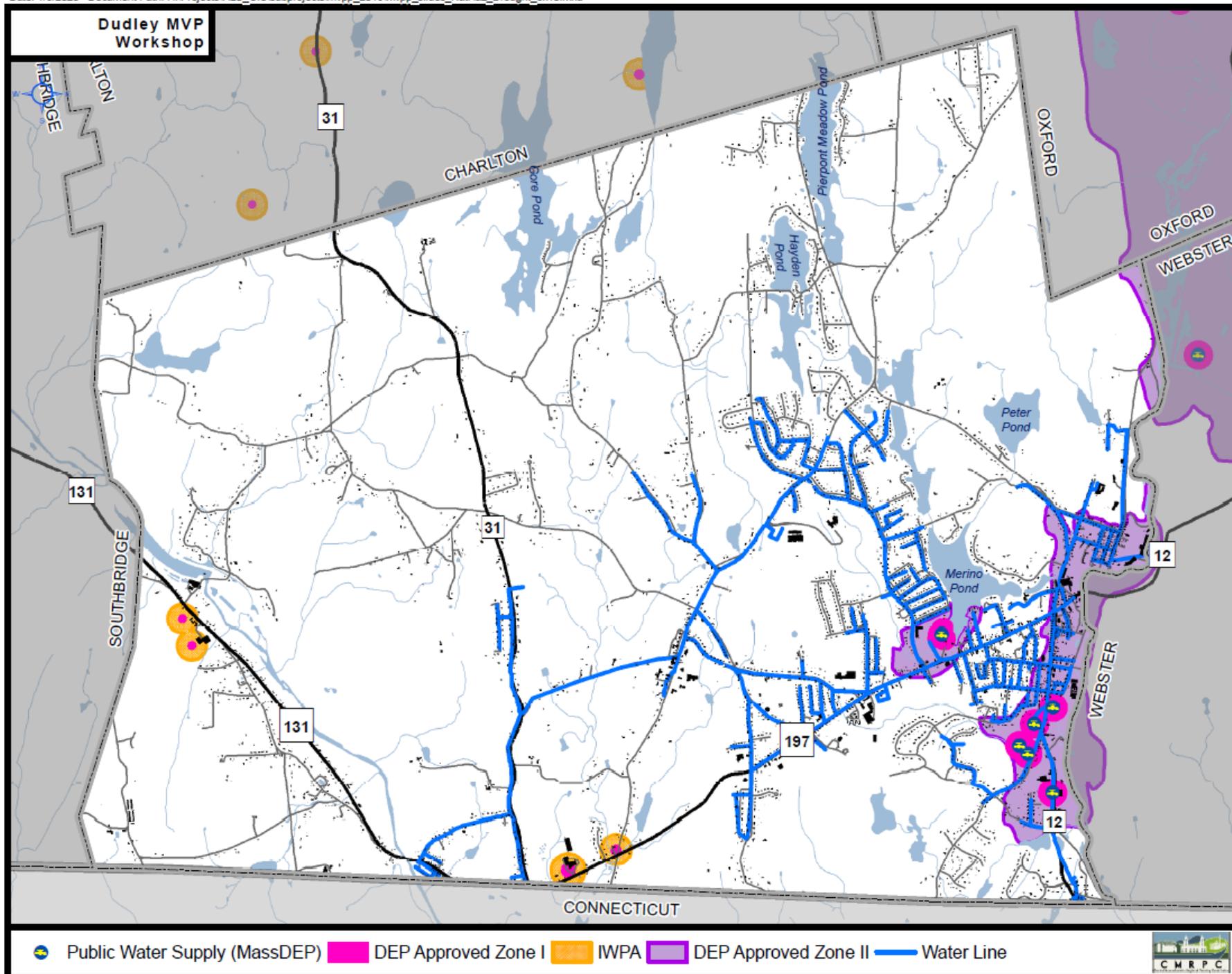




# FLOODING IMPACTS



# DROUGHT IMPACTS

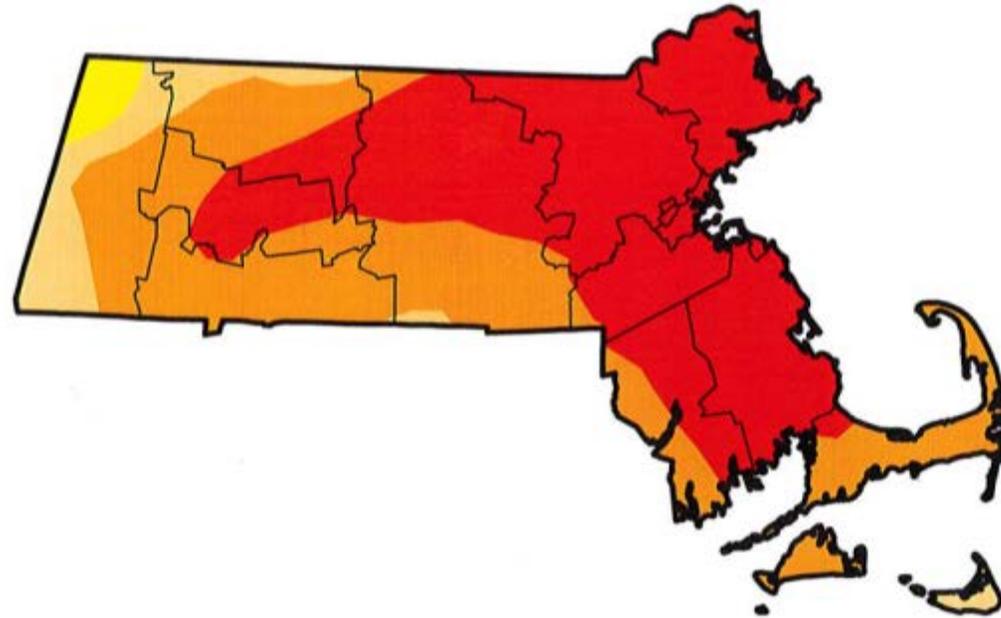


Source: Data provided by the Town of Dudley, CMRPC, massDOT, MassGIS. Information depicted on this map is for planning purposes only.



# U.S. Drought Monitor Massachusetts

**September 13, 2016**  
(Released Thursday, Sep. 15, 2016)  
Valid 8 a.m. EDT



*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.00	100.00	98.15	89.95	52.13	0.00
<b>Last Week</b> <i>9/6/2016</i>	0.00	100.00	94.38	77.38	22.67	0.00
<b>3 Months Ago</b> <i>6/14/2016</i>	20.09	79.91	13.56	0.00	0.00	0.00
<b>Start of Calendar Year</b> <i>12/29/2015</i>	22.85	77.15	26.34	0.00	0.00	0.00
<b>Start of Water Year</b> <i>9/29/2015</i>	12.90	87.10	30.43	0.00	0.00	0.00
<b>One Year Ago</b> <i>9/15/2015</i>	34.81	65.19	0.23	0.00	0.00	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

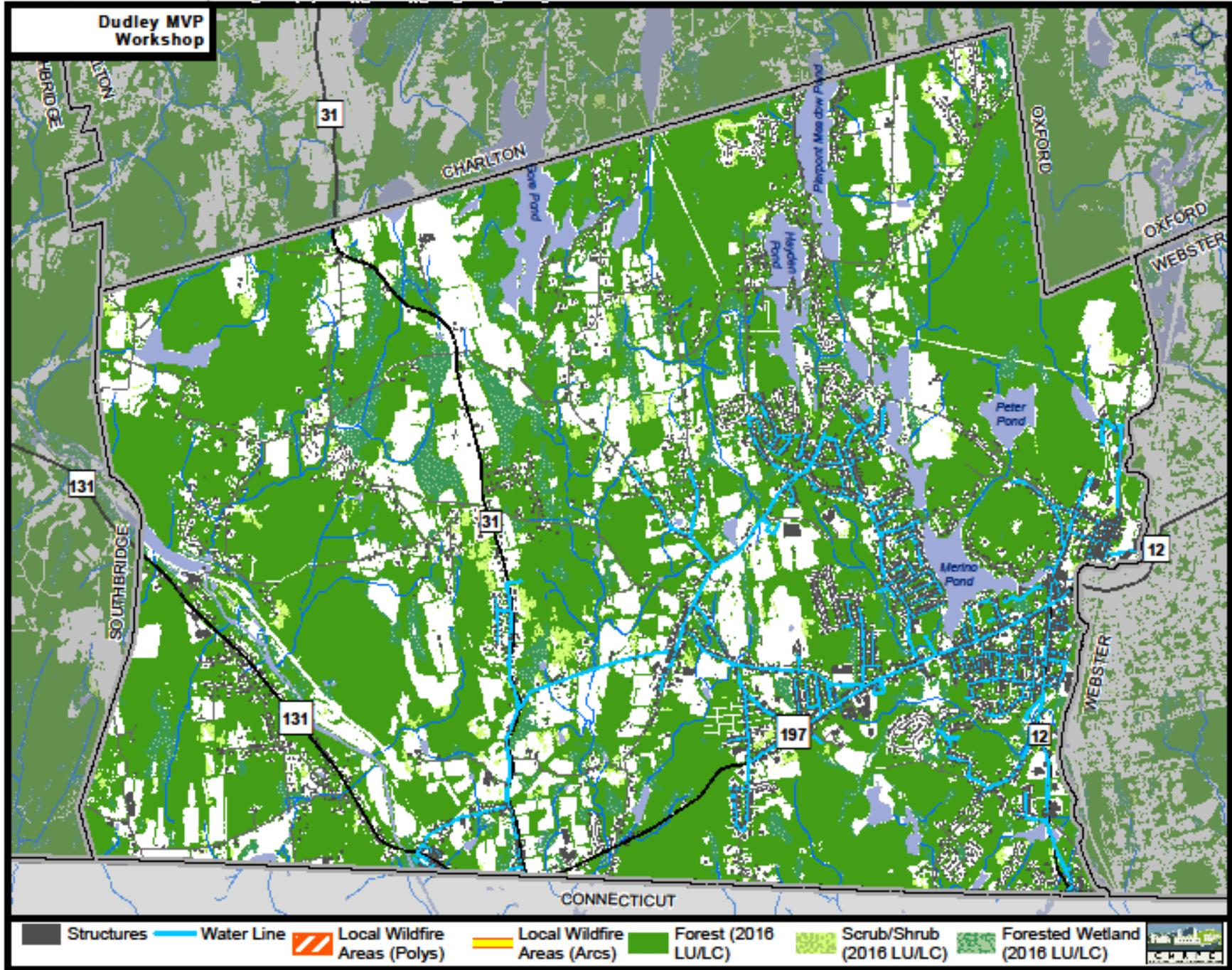
**Author:**  
*Eric Luebehusen*  
U.S. Department of Agriculture



<http://droughtmonitor.unl.edu/>

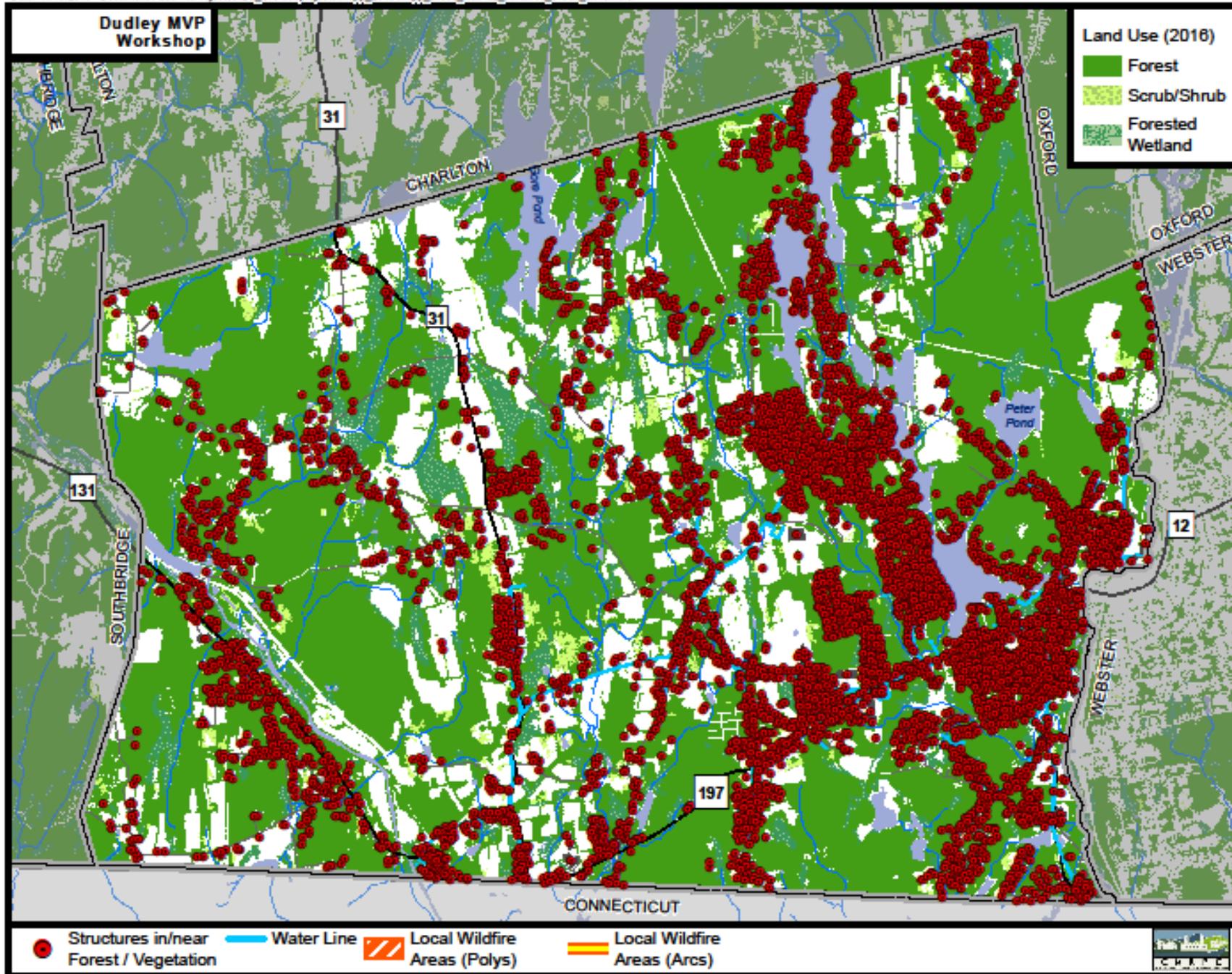


# WILDFIRE



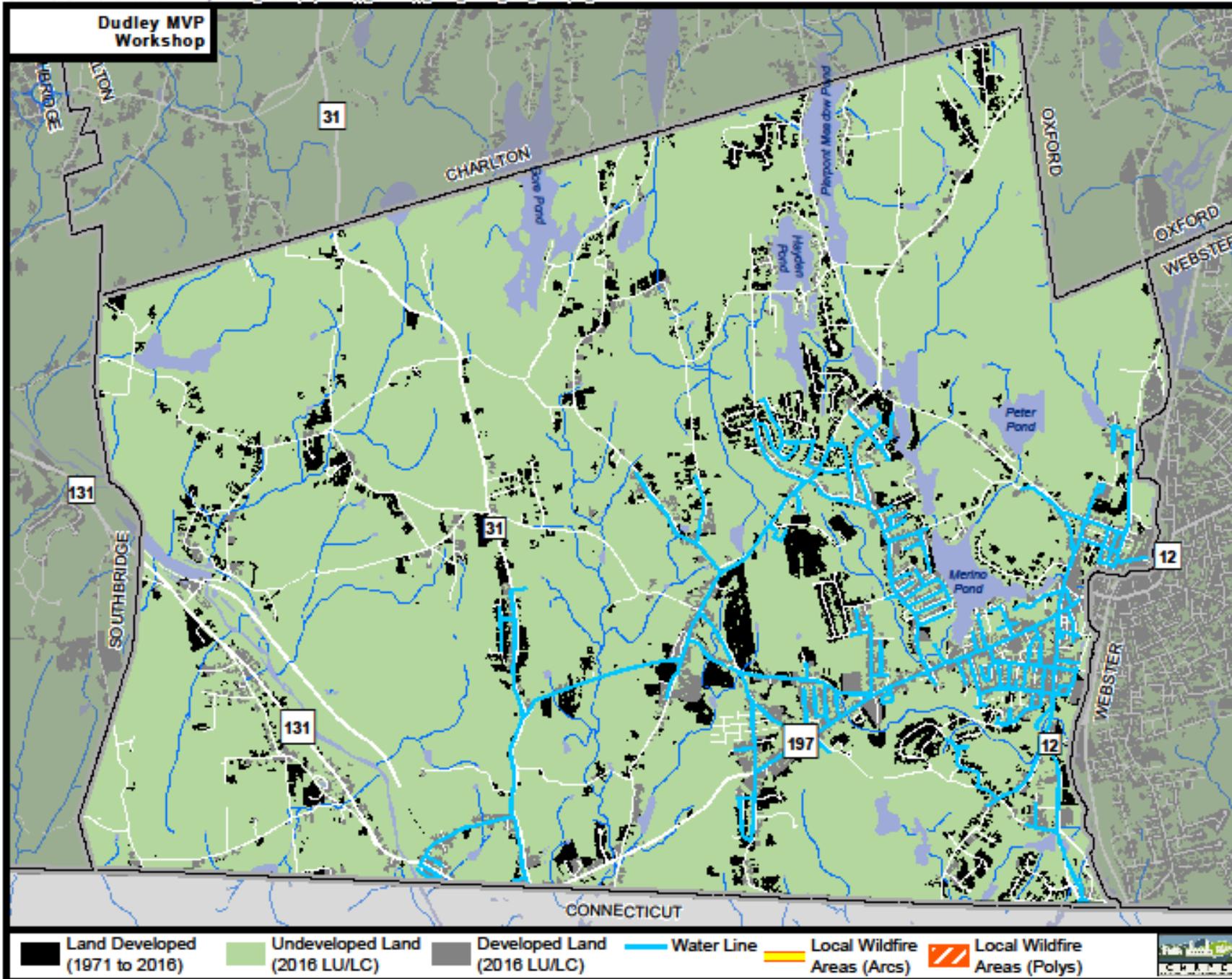
# WILDLAND/URBAN INTERFACE

Date: 11/19/2019 Document Path: H:\Project\HLS\_GIS\subproject\mvp\_2019\mvp\_slides\_Net\hr\_Wildfire\_Urban\_8x10.mxd



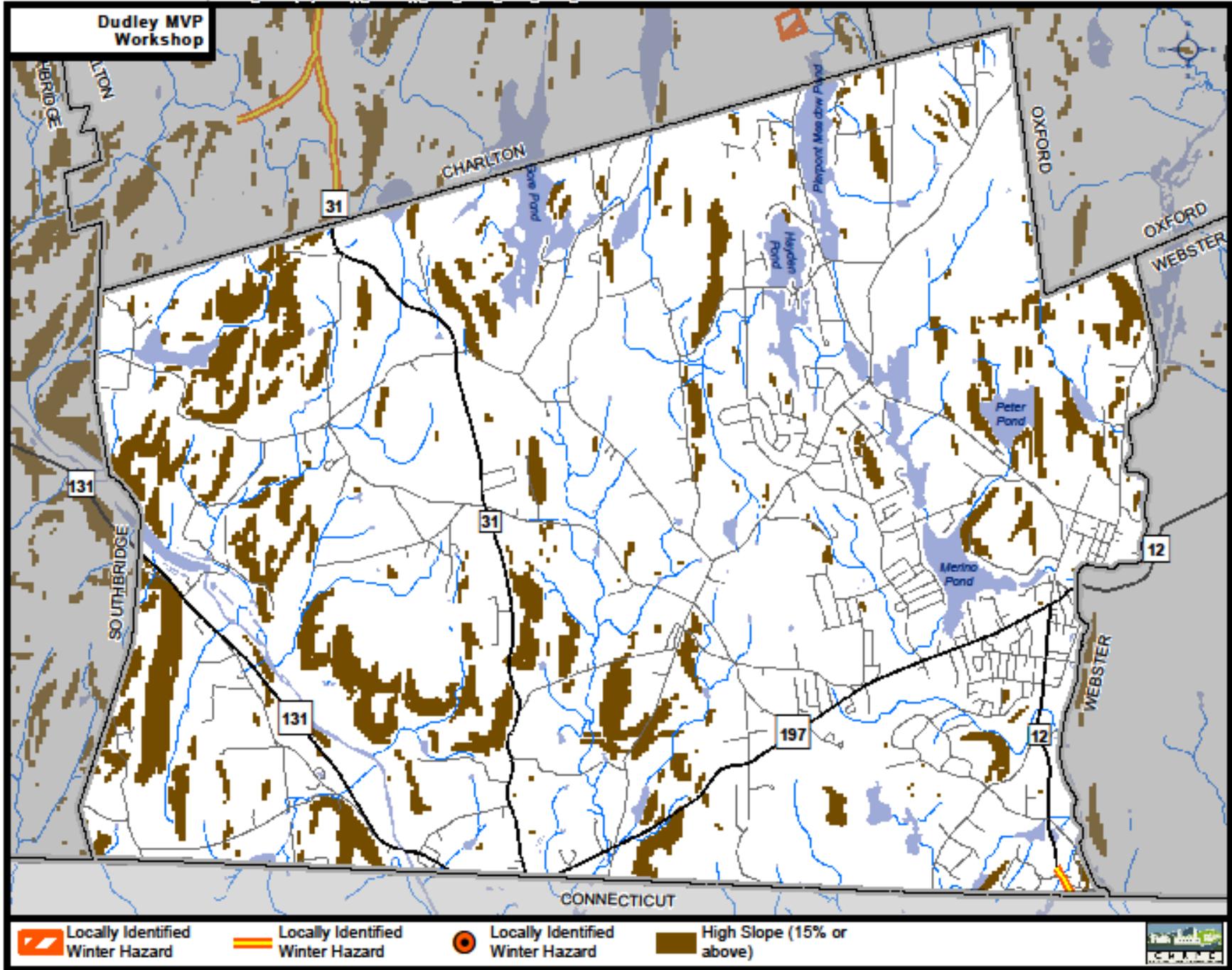
# FIRE & NEW DEVELOPMENT

Date: 11/20/2019 Document Path: H:\Project\HLS\_GIS\subproject\mvp\_2019\mvp\_slides\_NatHaz\_Land\_Developed\_8x10.mxd



# WINTER STORMS

Date: 11/19/2019 Document Path: H:\Projects\HLS\_GIS\subproject\mvp\_2019\mvp\_slides\_NatHaz\_Winter\_Storms\_8x10.mxd



Source: Data provided by the town of Dudley, CMRPC, MassDOT, WMASS. Information depicted on this map is for planning purposes only.



# EXTREME STORMS

## Tornado Tracks, 1950-2017

Show Touchdown Points

### Filter by Magnitude:

- F/EF 0 —
- F/EF 1 —
- F/EF 2 —
- F/EF 3 —
- F/EF 4 —
- F/EF 5 —

### Filter by Year Range:

1950 through 2017

### Filter by Month:

All Months

### Filter by Casualties:

- Injuries > 0
- Fatalities > 0

### For more information, click any:

- Track (for tornado data)
- County (for county image)

Please note: Attempting to view many tracks may significantly hinder performance.



### Send Feedback

Tornado data from the  
National Weather Service  
Storm Prediction Center:  
<http://www.spc.noaa.gov/gis/svrgis>



# CRITICAL INFRASTRUCTURE & FACILITIES

- What infrastructure and facilities are critical to the region and its residents? Which do we most need or desire to protect from hazards?
  - Those needed to respond to hazard events or which would exacerbate hazard scenarios, if affected
  - Those needed to perform day-to-day municipal operations and to support basic services and economic activity
  - Major employers and institutions, natural and cultural resources, recreational and historic sites, etc...

# VULNERABLE POPULATIONS

- Vulnerability is not just about utilities, facilities, or businesses
  - Disproportionate populations of potentially vulnerable demographic groups (elderly, children, etc.) or socioeconomic groups (low income households, etc.) living/working in high-risk areas
  - Can be on neighborhood scale, or at specific locations
  - Cultural vulnerability (cultural or language isolation)
  - These will evolve over time, as climate and populations change



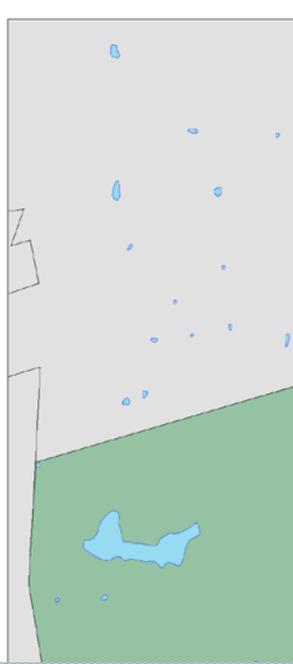
# VULNERABLE POPULATIONS: SENIORS (65+)

Municipal Vulnerability  
Preparedness (MVP)  
Workshop: Dudley

## Legend

### Percent Population over 65

- 0% - 9.51%
- 9.52% - 13.05%
- 13.06% - 17.21%
- 17.22% +



Add Map

# VULNERABLE POPULATIONS: UNDER AGE 18

## Municipal Vulnerability Preparedness (MVP) Workshop: Dudley

### Legend

#### Percent Population Children

- 0% - 16.27%
- 16.28% - 20.01%
- 20.02% - 23.68%
- 23.69% +



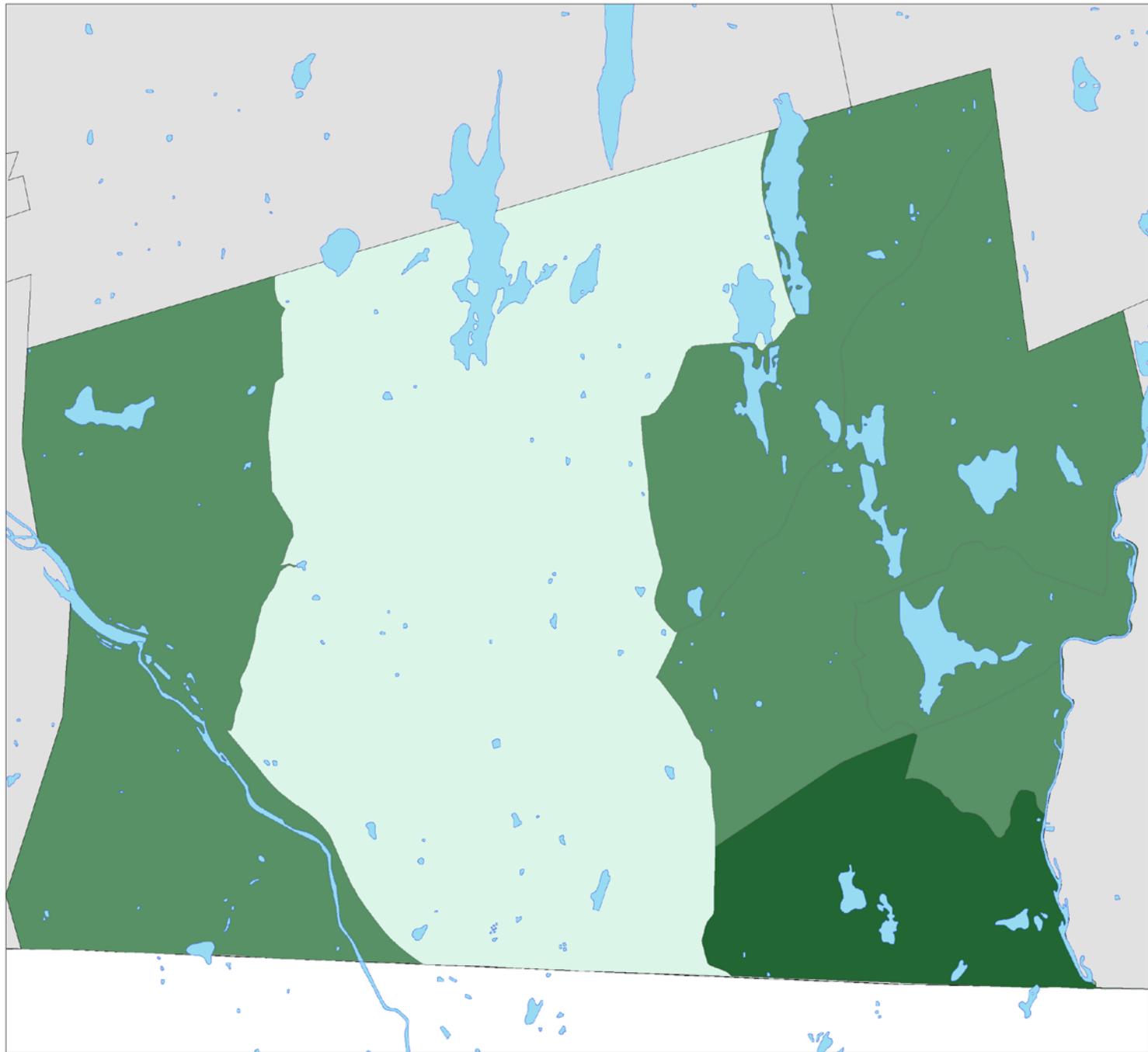
0 0.25 0.5 1 Miles

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission,  
1 Mercantile Street, Suite 520, Worcester, MA 01608  
Visit us on-line at - <http://www.cmrpc.org>

R:\Pre-Disaster Mitigation\MVP

Date: 12/4/2019

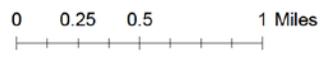


# VULNERABLE POPULATIONS: RENTER OCCUPIED

Municipal Vulnerability Preparedness (MVP)  
Workshop: Dudley

## Legend

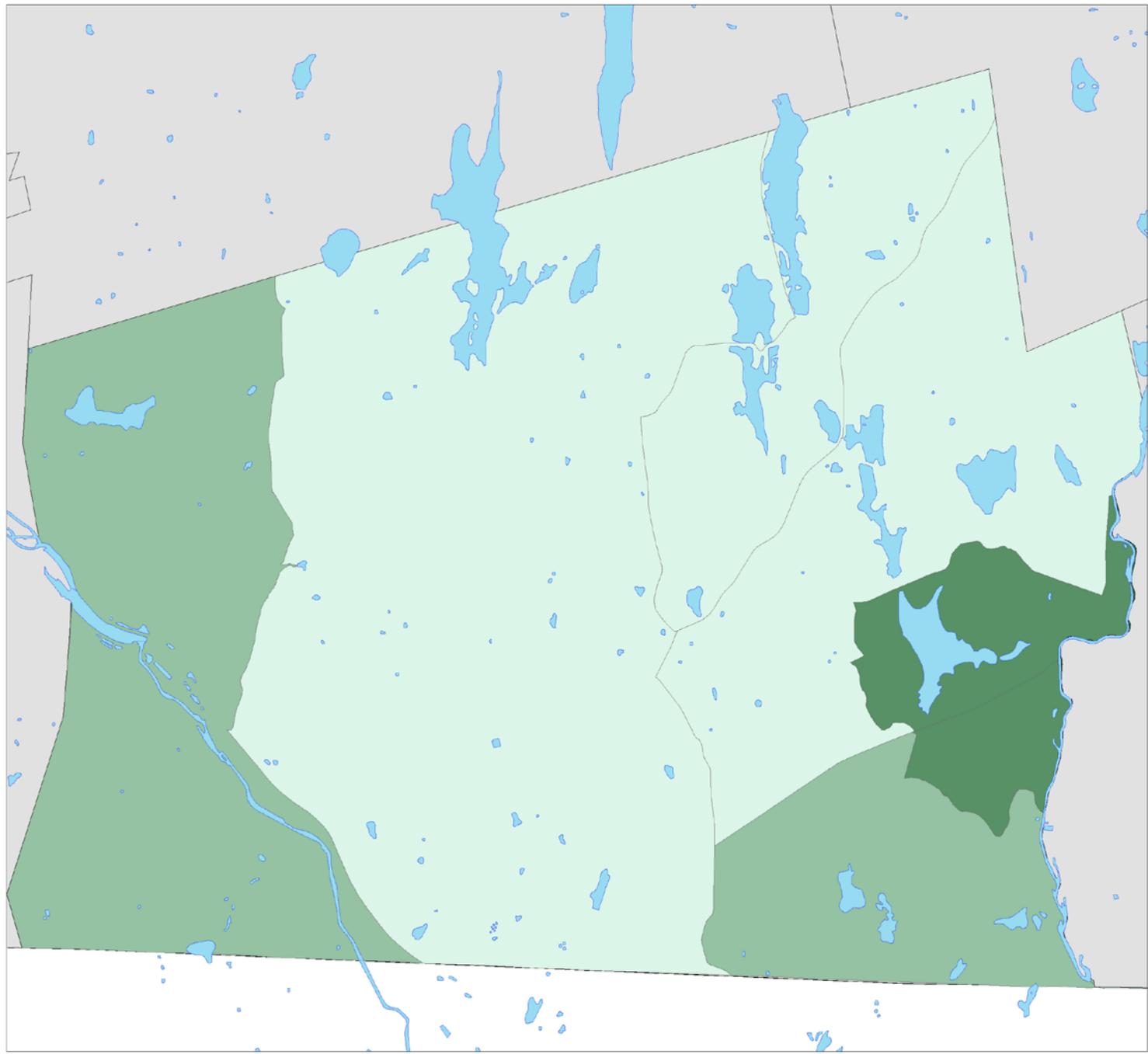
- Percent of Renters
- 0% - 13.571429%
  - 13.57143% - 33.333333%
  - 33.333334% - 58.894646%
  - 58.894647% - 100%



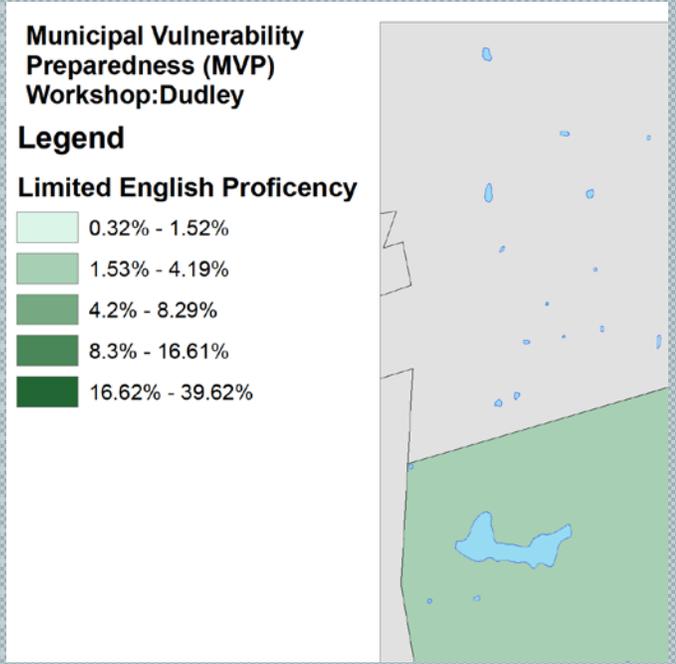
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R:\Pre-Disaster Mitigation\MVP Date: 1/24/2019

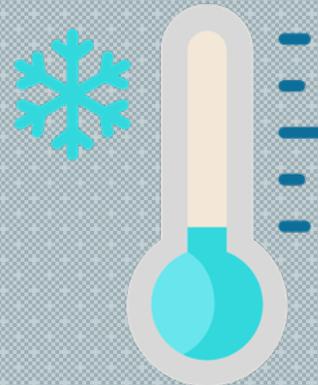
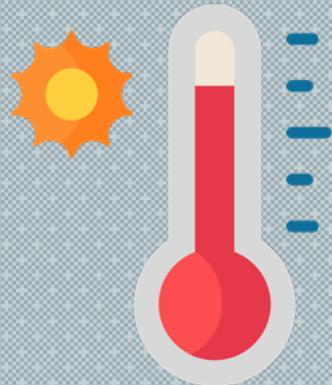
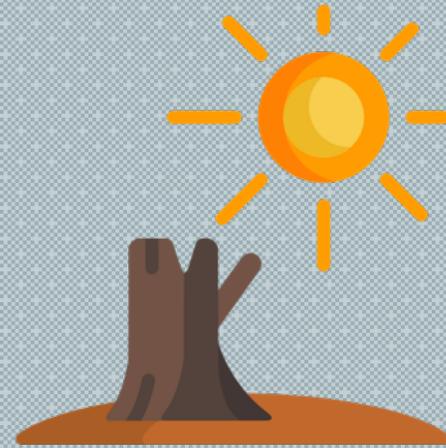


# VULNERABLE POPULATIONS: LATINO/HISPANIC



Add Map

# QUESTIONS





## STEP ONE: HAZARD IDENTIFICATION

# What are the Top Four Natural Hazards in Dudley?

I. Engage  
Community

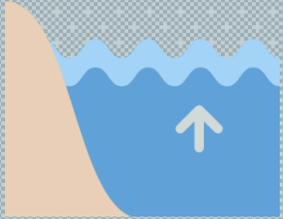
2. Identify CC  
Impacts &  
Hazards

3. Complete  
Assessment of  
Vulnerabilities  
& Strengths

4. Develop &  
Prioritize  
Actions

5. Take Action

# STEP ONE: HAZARD IDENTIFICATION



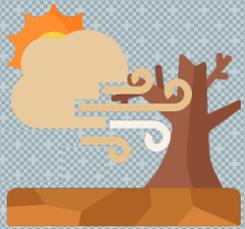
- **Flooding**
  - Riverine
  - Street



- **Landslides**
- **Mudslides**



- **Tornadoes**



- **Drought**
- **Dust Storms**



- **Tsunami**



- **Hurricanes/  
Nor'easters**



- **Wild Fires**



- **Winter Storms**
  - **Snow**
  - **Ice**



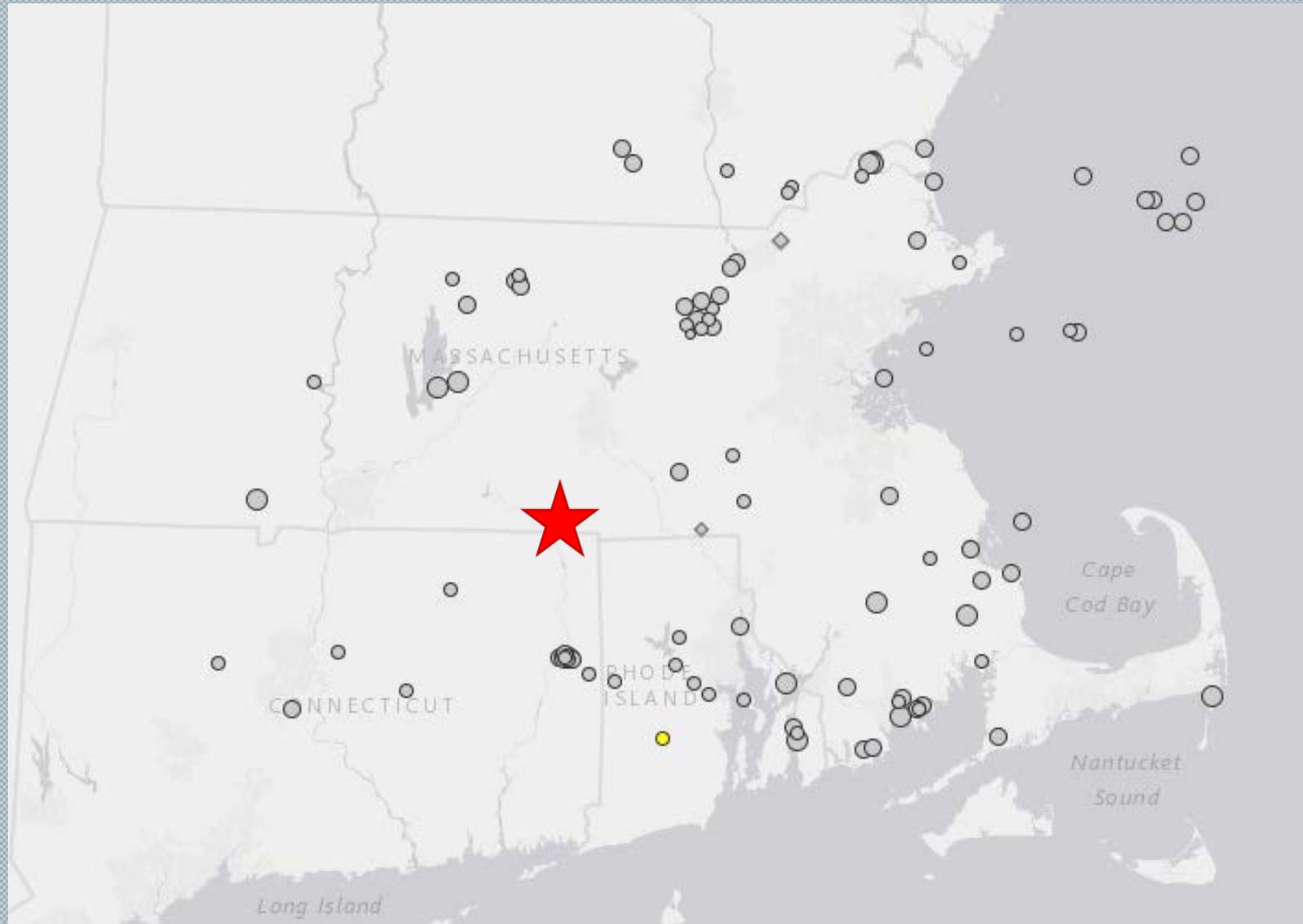
- **Earthquakes**



- **Extreme Temperatures**
  - **Heat**
  - **Cold**

Icons made by freepik, goodware, smashicons, those icons, icongeek26 and iconicar from Flaticon.com

# EARTHQUAKES FROM JANUARY 1975 – OCTOBER 2017

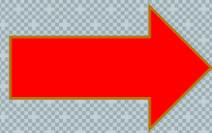


<https://earthquake.usgs.gov/earthquakes/map>





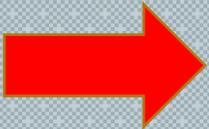
# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES



Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org								
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, drought, heat wave, etc.)			Priority		Time			
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	H	M	L	Short	Long	Ongoing
<b>Infrastructural</b>												
<b>Dam</b>												
<b>Societal</b>												
<b>Environmental</b>												

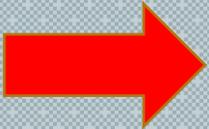
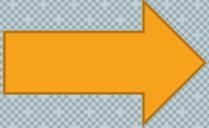
# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
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, drought, heat wave, etc.)				
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Priority	Time
							H - M - L	Short Long Ongoing
<b>Infrastructural</b>								
Dam								
<b>Societal</b>								
Senior Housing								
<b>Environmental</b>								



# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
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, drought, heat wave, etc.)				
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Priority	Time
							H · M · L	Short Long Ongoing
<b>Infrastructural</b>								
Dam								
<b>Societal</b>								
Senior Housing								
<b>Environmental</b>								
Wetlands								



# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

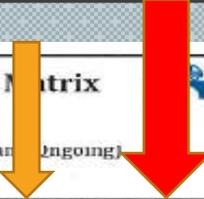


Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org			
H-M-L priority for action over the Short or Long term (ongoing)				Top Priority Hazards (tornado, floods, wildfire, hurricanes, drought, heat wave, etc.)			
V = Vulnerability S = Strength				Priority		Time	
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Short Long Ongoing
<b>Infrastructural</b>							
Dam	Estimated Location						
<b>Societal</b>							
Senior Housing							
<b>Environmental</b>							
Wetlands							



# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

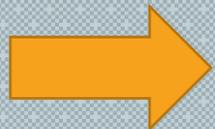
Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
H-M-L priority for action over the Short or Long term (and Ongoing) V = Vulnerability S = Strength				Top Priority Hazards (tornado, floods, wildfire, hurricanes, drought, heat wave, etc.)				
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Priority H · M · L	Time Short Long Ongoing
<b>Infrastructural</b>								
Dam								
<b>Societal</b>								
Senior Housing								
<b>Environmental</b>								
Wetlands								



Estimated Location

**Public? Private? State?**

# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES



Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
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, drought, heat wave, etc.)				
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Priority H-M-L	Time Short Long Ongoing
<b>Infrastructural</b>								
Dam								
<b>Societal</b>								
Senior Housing								
<b>Environmental</b>								
Wetlands								

Estimated Location

Public? Private? State?

Vulnerability or Strength

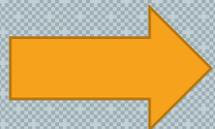
# BREAK OUT GROUP: STEP 1 AND 2

At your table:

- Step 1- Fill in top 4 Natural Hazards
- Step 2- Identify key features
  - Infrastructure- Dams
  - Societal- Senior Housing
  - Environmental- Wetlands
- Where is the Feature Located
- Identify ownership (Public, Private...)
- Identify vulnerability, strength or both

# TIME TO GET TO WORK

# STEP TWO: COMPLETED



Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
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, drought, heat wave, etc.)				
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	Priority H-M-L	Time Short Long Ongoing
<b>Infrastructural</b>								
Dam								
<b>Societal</b>								
Senior Housing								
<b>Environmental</b>								
Wetlands								

Estimated Location  
 Public? Private? State?  
 Vulnerability or Strength





# NATURE BASED SOLUTIONS (LID)

- Natural systems mimic natural processes to absorb and slow runoff and stormwater, and also reduce heat islands.
- Low impact development (LID) designs can be integrated into new development at neighborhood scales and work with traditional approaches



**Bioswale between sidewalk and street**

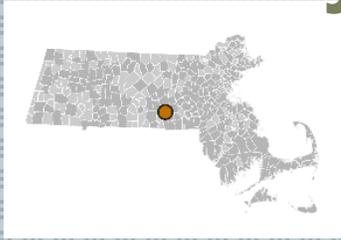


**Contained bioswale or planter box**

# Example Action Grant Projects

Nature-Based Flood Protection, Drought Prevention, Water Quality, and Water Infiltration Techniques

## Millbury



Designing **green infrastructure** like stormwater planters, bioretention bump outs, rain gardens, and other measures like porous pavers and pervious pavement **to reduce heat island effects and stormwater runoff** into the Blackstone River.



Nature-based solutions

# MORE EXAMPLES OF LOW IMPACT DEVELOPMENT AND GREEN INFRASTRUCTURE



**Green Parking Lots**

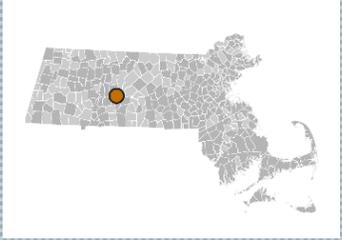


**Permeable Paving**

# Example Action Grant Projects

Nature-Based Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques

## Belchertown



Designing and permitting for a **replacement water storage tank** that would increase storage capacity and resiliency to drought, and completing a **feasibility/ concept design of a rainwater harvesting system** at Belchertown High School to irrigate the athletic fields.



Nature-based  
solutions

Pilot potential

# ECONOMIC BENEFITS OF LID AND GREEN INFRASTRUCTURE PROJECTS

Aquatic restoration projects in MA, like these natural culverts, are contributing to a growing “restoration economy” by providing jobs and economic output.

## Traditional Culvert



## Nature Based Culvert

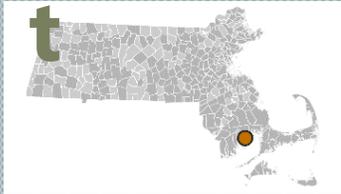


# Example Action Grant Projects

Land Acquisition for Resilience

## Mattapoiset

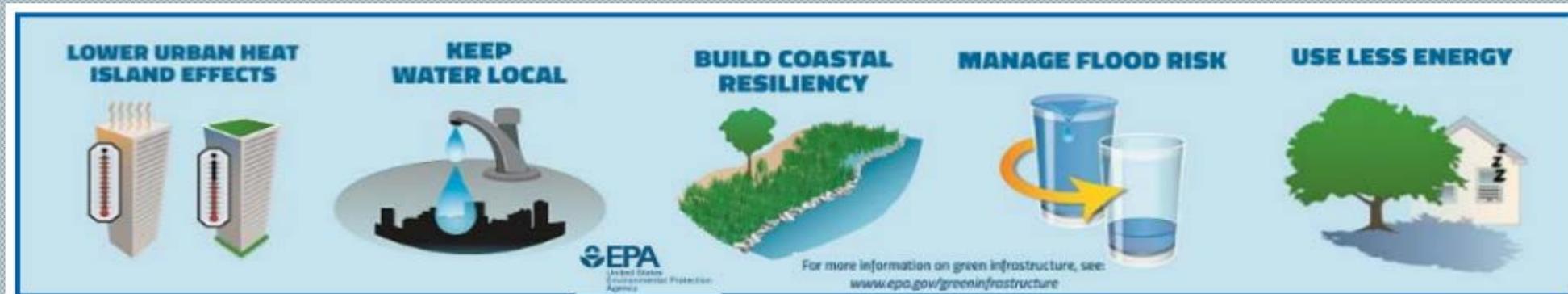
Purchasing 120 acres of forest, streams, freshwater wetlands and coastal salt marsh as conservation land to prevent development in vulnerable areas



Data  
utilization  
Proactive

# BENEFITS OF GREEN INFRASTRUCTURE AND LID

- Cost Savings
  - Reduced development costs for infrastructure and maintenance
  - Reduced energy costs for residents
- Public Safety
  - Reduced flooding
  - Improved water quality
  - Increased climate change resiliency
  - Reduced urban heat island effect
- Quality of Life
  - Protect and restore natural features for improved aesthetics
- Value
  - Increased property values
- Regulatory
  - Assistance in meeting regulatory requirements









# TIME TO GET TO WORK

# REPORT OUTS

**What did your table  
find?**

# TIME TO VOTE

- Add one dot to each category
- Place remaining two dots any where you would like
- Return to your seat when completed

# SUMMARY DISCUSSION

- Areas of agreement
- Areas of unique perspectives

# NEXT STEPS

- Report development
- Public “Listening” session with Members of the Public and Board of Selectmen February 24, 2020
- Develop resources and Implement actions.

**I. Engage  
Community**

**2. Identify CC  
Impacts &  
Hazards**

**3. Complete  
Assessment of  
Vulnerabilities  
& Strengths**

**4. Develop &  
Prioritize  
Actions**

**5. Take Action**

# QUESTIONS OR COMMENTS

# CONTACT US

- Dudley Core Team Leader –
  - Jonathan Ruda , [jruda@dudleyma.gov](mailto:jruda@dudleyma.gov)
- CMRPC Project Leaders –
  - Peter Peloquin, [ppeloquin@cmrpc.org](mailto:ppeloquin@cmrpc.org)
  - Andrew Loew, [aloew@cmrpc.org](mailto:aloew@cmrpc.org)
- Executive Office of Energy and Environmental Affairs –
  - Hillary King, [hillary.king@state.ma.us](mailto:hillary.king@state.ma.us)

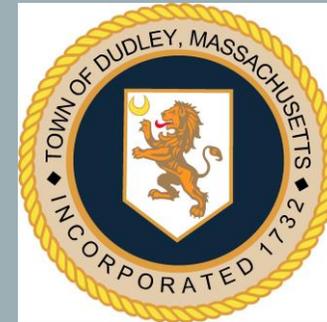
**THANK  
YOU**

# MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) PROGRAM

## Public Listening Session

**Dudley, MA**  
**February 24, 2020**

*Dudley Town Hall, Selectmen's Meeting Room*



# MUNICIPAL VULNERABILITY PREPAREDNESS (MVP)

- State grant program to support cities and towns to begin the process of planning for climate resiliency.
- MVP Planning Process includes CRB Workshop, Report, Listening Session and Annual Reporting
- Communities who complete the MVP Planning Process become certified as an MVP Community
- Designated communities become eligible for MVP Action Grant funding





## Municipal Vulnerability Preparedness (MVP) Program

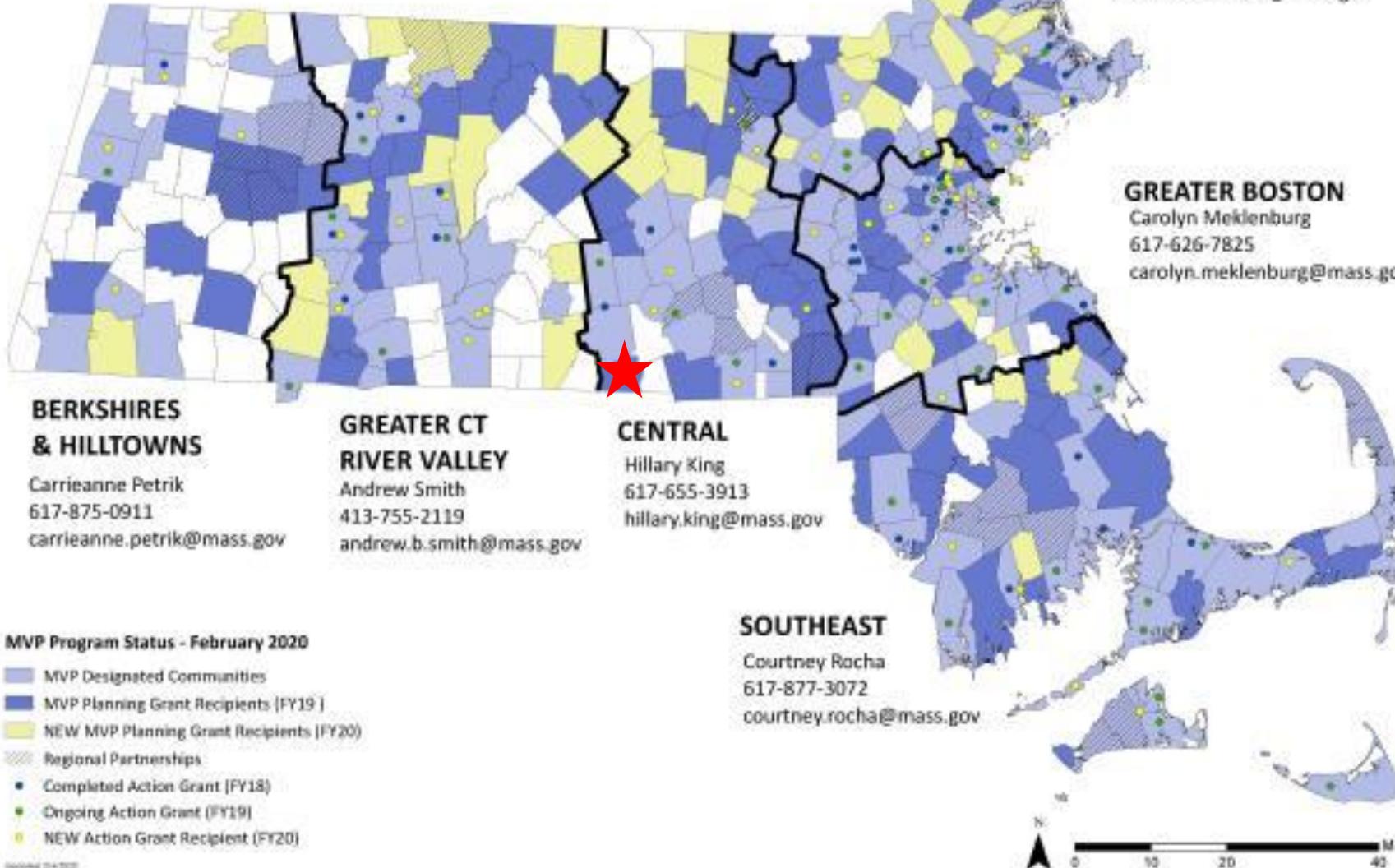
Program Manager: Kara Runsten, 617-626-7826, kara.runsten@mass.gov

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978-242-1358  
michelle.rowden@mass.gov

### GREATER BOSTON

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### BERKSHIRES & HILLTOWNS

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### GREATER CT RIVER VALLEY

Andrew Smith  
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### CENTRAL

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### SOUTHEAST

Courtney Rocha  
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courtney.rocha@mass.gov

#### MVP Program Status - February 2020

- MVP Designated Communities
- MVP Planning Grant Recipients (FY19)
- NEW MVP Planning Grant Recipients (FY20)
- Regional Partnerships
- Completed Action Grant (FY18)
- Ongoing Action Grant (FY19)
- NEW Action Grant Recipient (FY20)

ISSUED 04/2020



## COMMUNITY RESILIENCE BUILDING (CRB) PROCESS

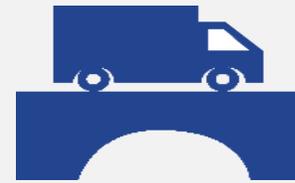
- Community-driven process led by a project coordinator (Jon Ruda) with a core team of Town officials and Department Heads
- Dudley's 6 member Core Team met 5 times, August, September, November, December and January
- Invitation-only workshop was held on January 10, 2020
- 34 attendees, including local officials, business, schools and non-profit groups
- Listening session (today) is open to the public



# CRB WORKSHOP OBJECTIVES

- Define extreme weather and climate-related hazards
- Identify current and future vulnerabilities and strengths
- Develop and prioritize actions for the community and broader stakeholder networks, and
- Identify opportunities for the community to advance actions to reduce risks and build resilience

# PRIMARY TOPIC AREAS



■ Infrastructure



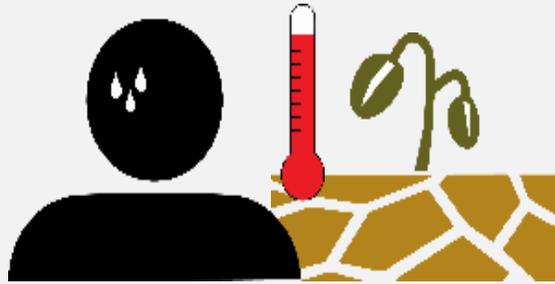
■ Society



■ Environment

# STEP ONE: IDENTIFY TOP 4 HAZARDS

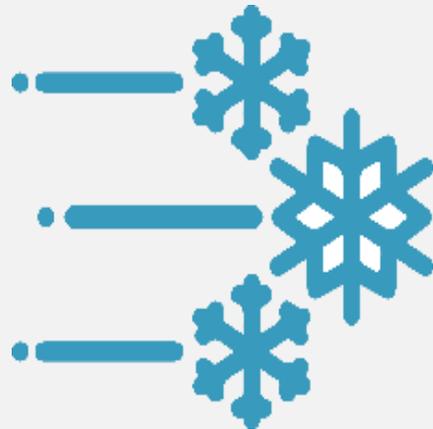
## EXTREME TEMPERATURES



## FLOODING



## WINTER STORMS

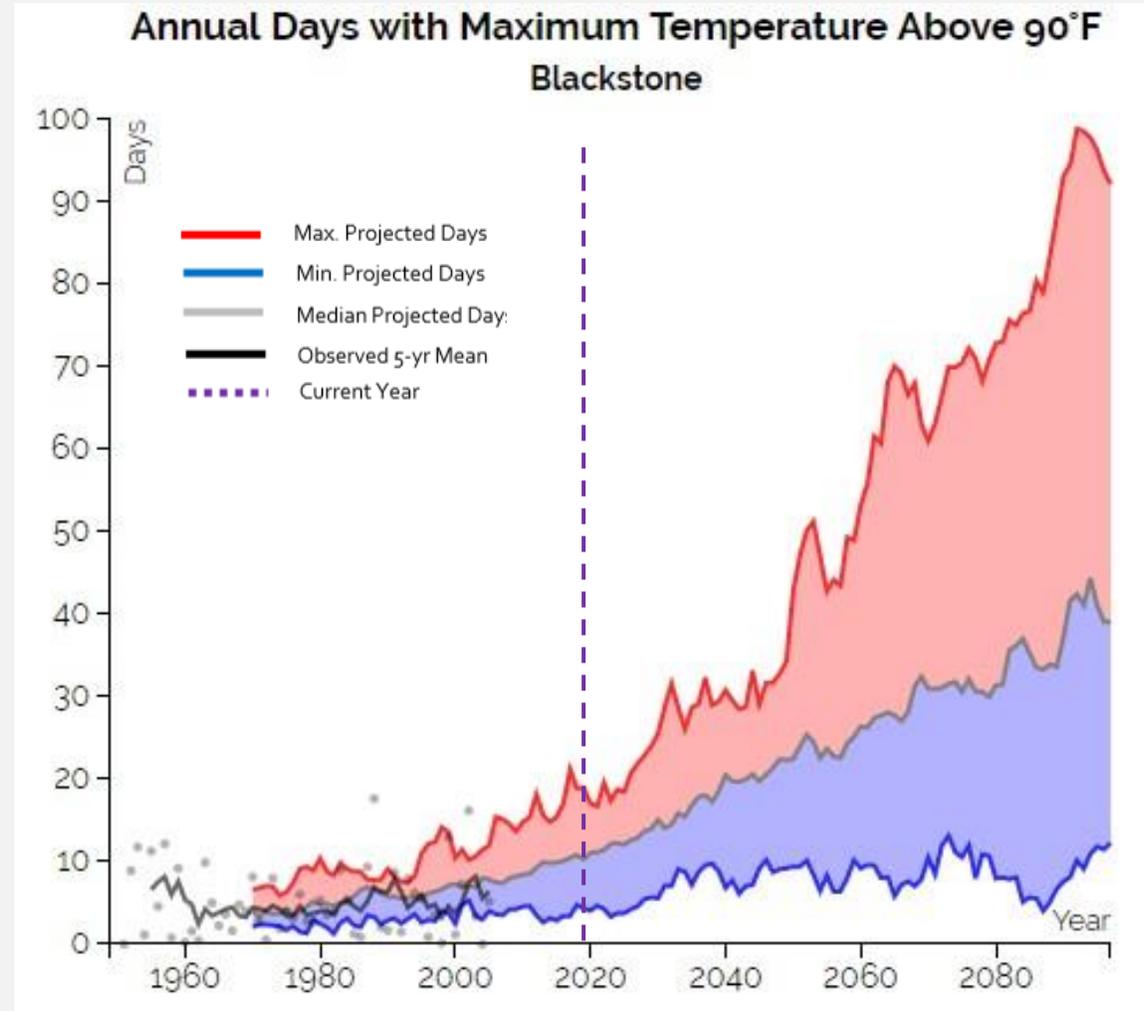


## WIND EVENTS

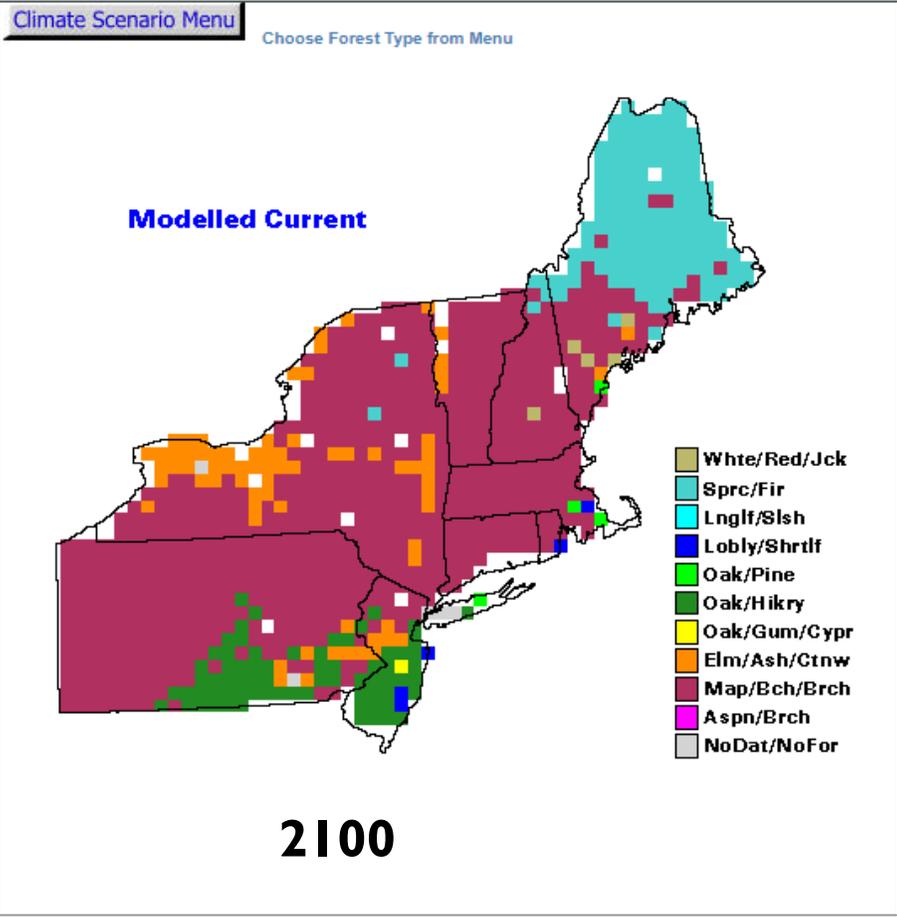
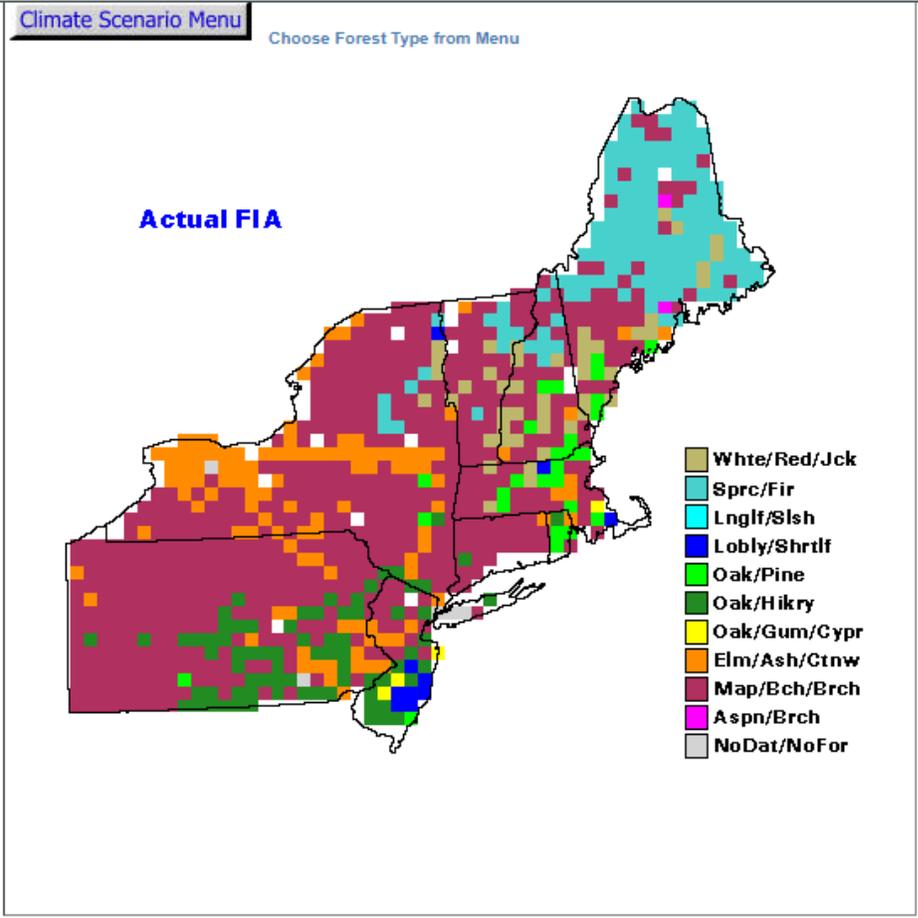


# HEAT PROJECTIONS

- Projected increase of 8 to 29 days annually over 90°F by mid century
- Projected increase of 11 to 69 days annually over 90°F by end of century

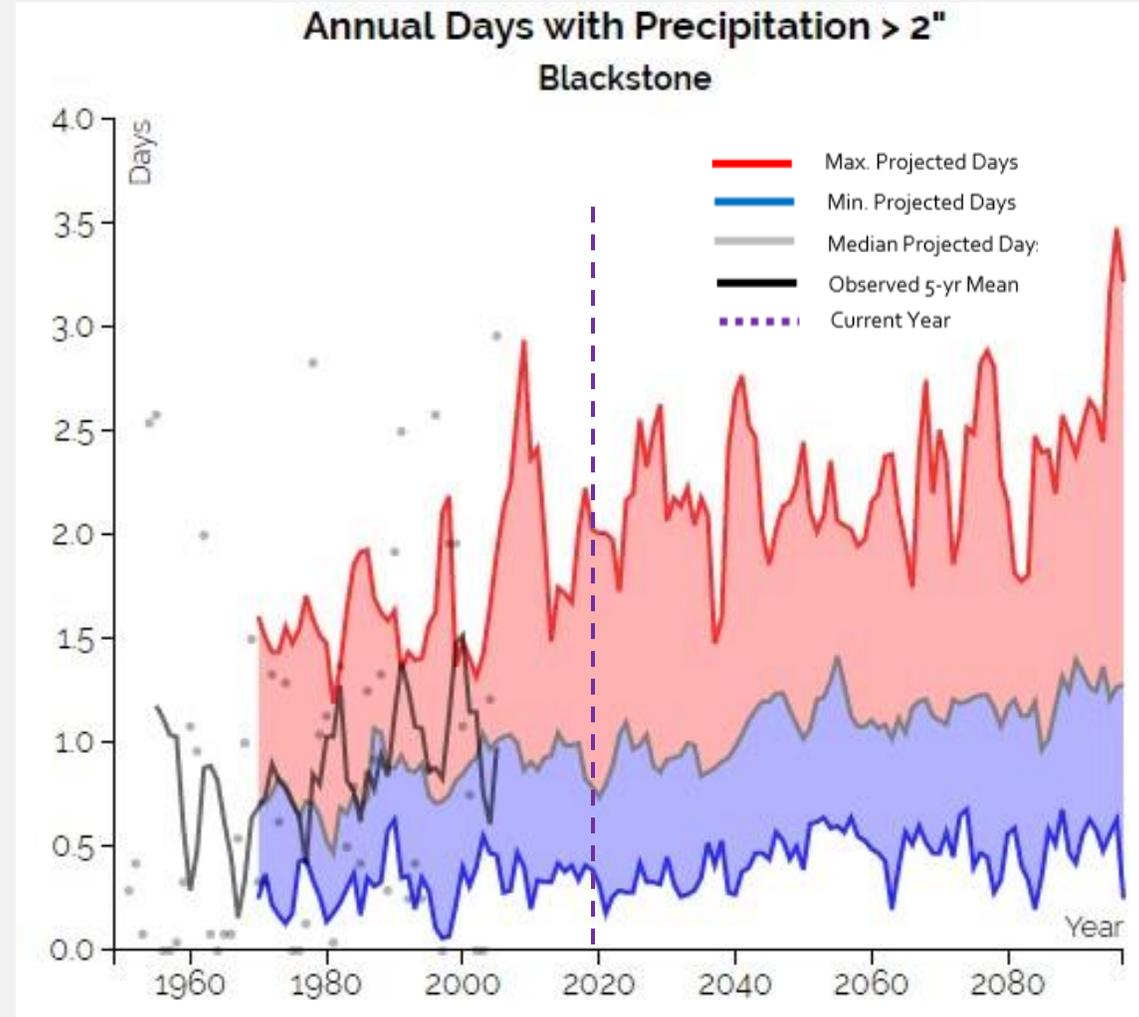


# HEAT IMPACTS ON THE ENVIRONMENT



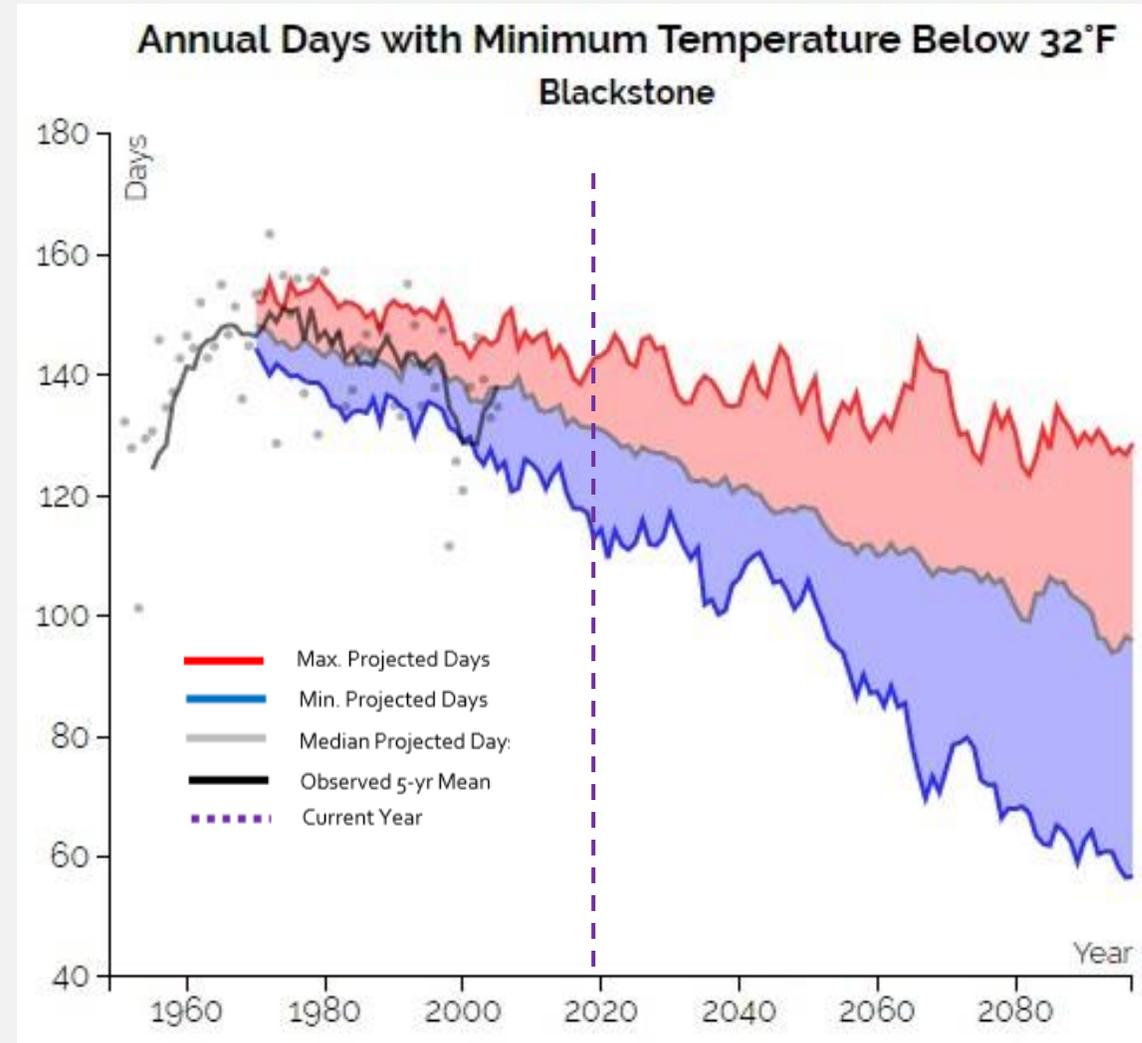
- Expected to move north
- Diversity of species will likely decrease
- Likely increase in invasive species

# HEAVY RAINFALL AND FLOODING



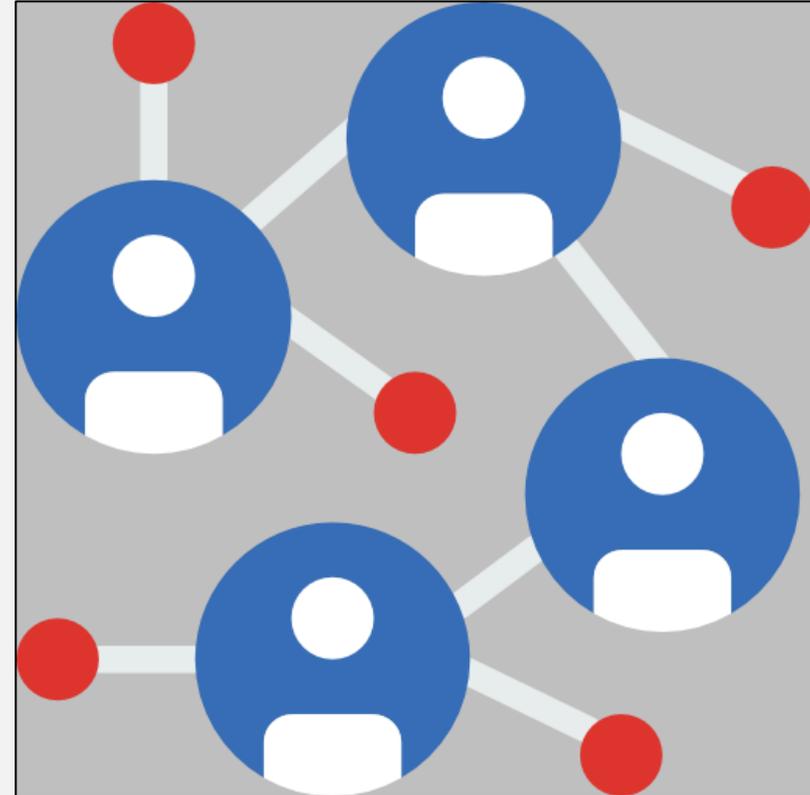
# WINTER STORMS

- Annual days below freezing will decrease
- Rising temps → more winter precipitation to fall as rain or freezing rain
- Lower snowfall accumulation
- Winter - Highest projected increase in precipitation
- Storms that do occur may be worse - proximity to Atlantic Ocean increases risk of large storm events



# BREAKOUT GROUPS

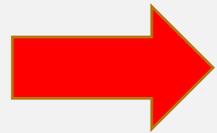
- 5 Tables of 5-6 individuals
- 3 Focus Sections
- 4 Focus Hazards
  - Flooding
  - Wind Event
  - Winter Storms
  - Extreme Temperatures
- Tools and Resources
  - Matrix, Maps, HMP & Each Other



Icon made Prettyicons from Flaticon.com



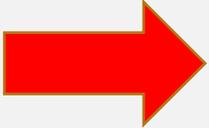
# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES



Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
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, drought, heat wave, etc.)			Priority	Time
Features	Location	Ownership	V or S	Floods	Winter Storms	Droughts & Wildfires	H - M - L	Short Long Ongoing
<b>Infrastructural</b>								
<b>Dams</b>								
<b>Societal</b>								
<b>Environmental</b>								

# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

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Features				Floods	Winter Storms	Droughts & Wildfires	Priority	Time
Location	Ownership	V or S				H-M-L	Short Long Ongoing	
<b>Infrastructural</b>								
Dams								
<b>Societal</b>								
<b>Elderly, Renter</b>								
<b>Environmental</b>								



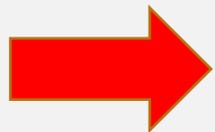
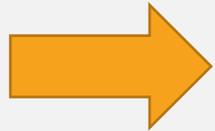
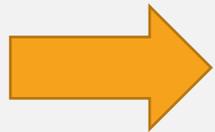
# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

**Community Resilience Building Risk Matrix**  [www.CommunityResilienceBuilding.org](http://www.CommunityResilienceBuilding.org)

**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, drought, heat wave, etc.)

Features	Location	Ownership	V or S	Top Priority Hazards			Priority		Time	
				Floods	Winter Storms	Droughts & Wildfires	H-M-L	Short Long Ongoing		
<b>Infrastructural</b>										
Dams										
<b>Societal</b>										
Elderly, Renter										
<b>Environmental</b>										
Invasive Species										



# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES



Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org				
H-M-L priority for action over the Short or Long term (ongoing)				Top Priority Hazards (tornado, floods, wildfire, hurricanes, drought, heat wave, etc.)				
V = Vulnerability S = Strength				Floods	Winter Storms	Droughts & Wildfires	Priority	Time
Features	Location	Ownership	V or S	H	M	L	Short	Long
Ongoing								
<b>Infrastructural</b>								
Dams	Estimated Location							
<b>Societal</b>								
Elderly, Renter								
<b>Environmental</b>								
Invasive Species								



# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

**Community Resilience Building Risk Matrix**  [www.CommunityResilienceBuilding.org](http://www.CommunityResilienceBuilding.org)

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, drought, heat wave, etc.)

Features	Location	Ownership	V or S	Top Priority Hazards			Priority		Time	
				Floods	Winter Storms	Droughts & Wildfires	H	M	L	Short
<b>Infrastructural</b>										
Dams										
<b>Societal</b>										
Elderly, Renter										
<b>Environmental</b>										
Invasive Species										



Estimated Location

**Public? Private? State?**

# STEP TWO: WHAT, WHERE, WHO AND VULNERABILITIES

www.CommunityResilienceBuilding.org

**Community Resilience Building Risk Matrix**

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

Top Priority Hazards (tornado, floods, wildfire, hurricanes, drought, heat wave, etc.)

Features	Location	Ownership	V or S	Top Priority Hazards (tornado, floods, wildfire, hurricanes, drought, heat wave, etc.)			Priority		Time	
				Floods	Winter Storms	Droughts & Wildfires	H	M	L	Short
<b>Infrastructural</b>										
Dams										
<b>Societal</b>										
Elderly, Renter										
<b>Environmental</b>										
Invasive Species										







# TABLE SUMMARIES



# GROUP VOTE



# WHAT DID THE GROUP FIND?



# INFRASTRUCTURE CONCERNS



- Dams
- Stormwater Management/  
Flooding
- Water Services
- Municipal Facilities

Gore Pond Dam, Photo courtesy of Michelle Jervis

# INFRASTRUCTURE STRENGTHS



- Municipal Resources
- Public Safety
- Public Water System
- Bylaws

# INFRASTRUCTURE ACTIONS

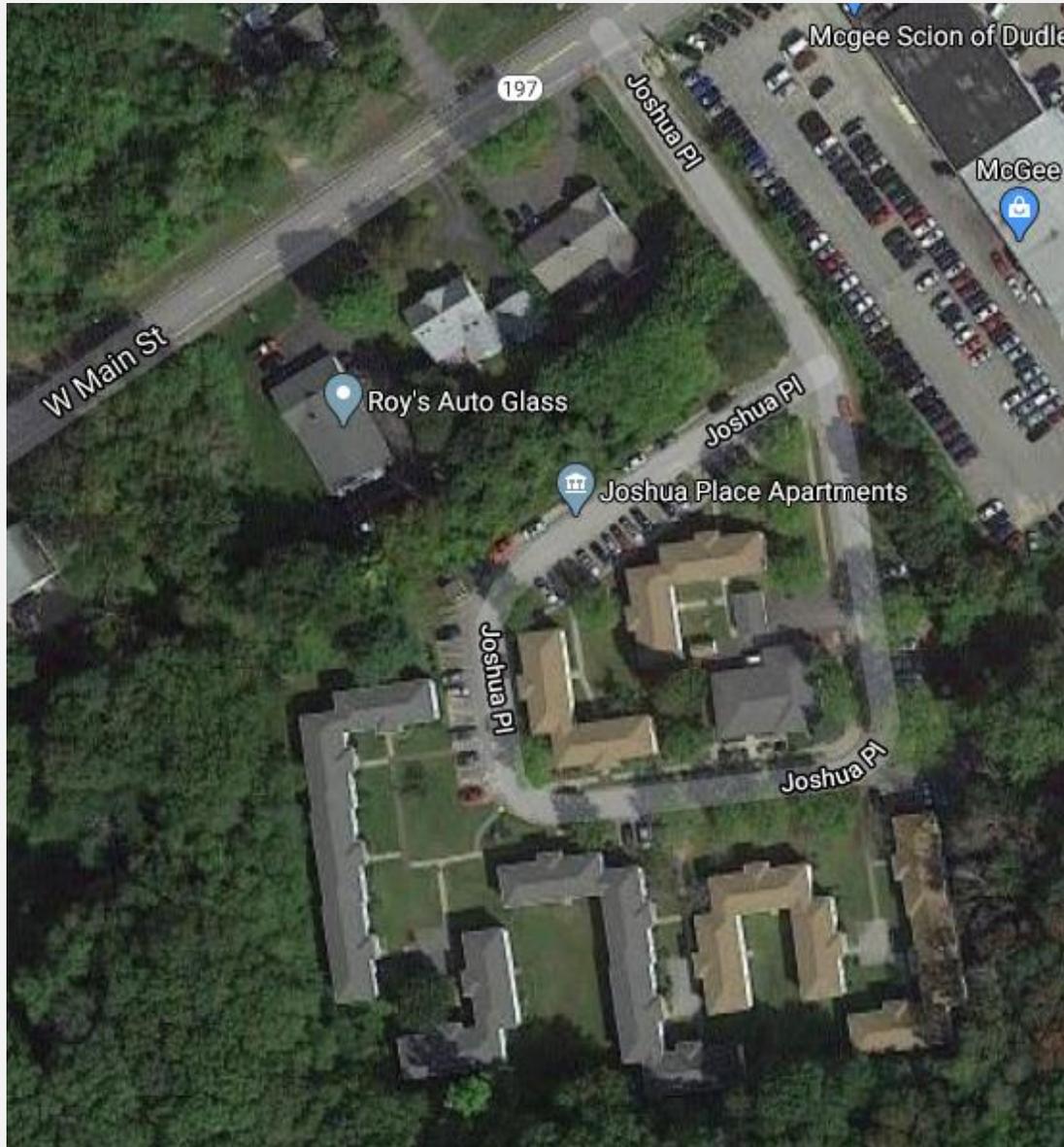
## High Priority

- Dam Assessment
- Water
  - Potable
  - Waste
- Stormwater Management
- Roadways egress and flood control

## Medium and Low Priority

- Electrical Grid
- Septic Systems
- Zoning and By-Law review

# SOCIETAL CONCERNS

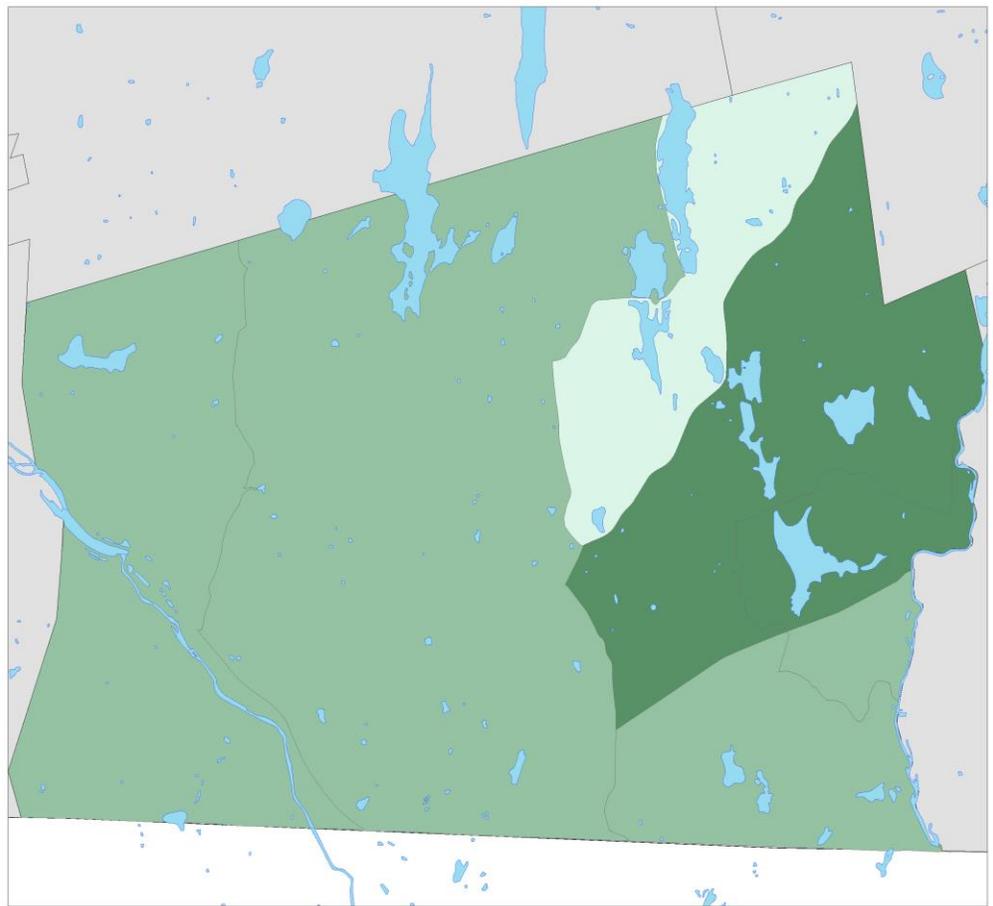


- Senior Residents
- Vulnerable Populations
- Communication
- Insect Borne Diseases

# RENTERS + OVER AGE 65 POPULATION

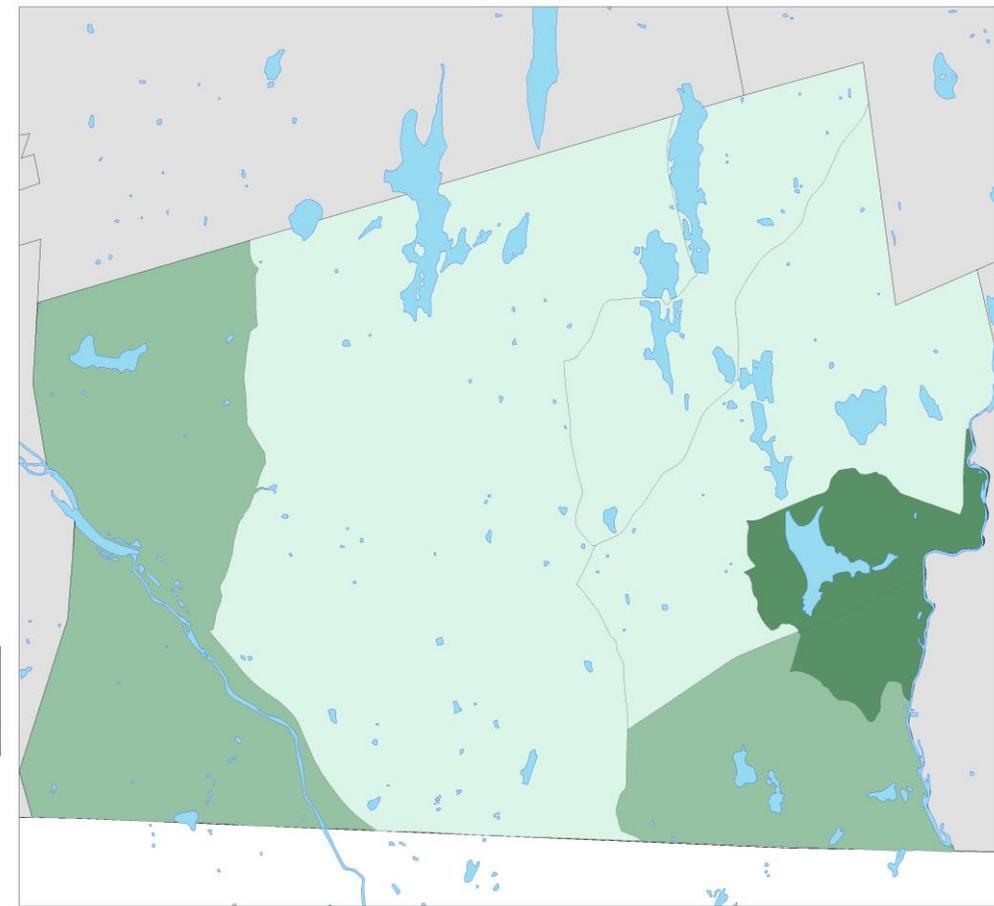
Municipal Vulnerability Preparedness (MVP) Workshop:Dudley

**Legend**  
**Percent Population over 65**  
 0% - 9.51%  
 9.52% - 13.05%  
 13.06% - 17.21%  
 17.22% +



Municipal Vulnerability Preparedness (MVP) Workshop:Dudley

**Legend**  
**Percent of Renters**  
 0% - 13.571429%  
 13.57143% - 33.333333%  
 33.333334% - 58.894646%  
 58.894647% - 100%



# SOCIETAL STRENGTHS



- Community
- Emergency Shelters
- Public Safety
- Senior Programming

# SOCIETAL ACTIONS

## High Priority

- Vulnerable Populations
  - Outreach
  - Engagement
  - Participation
- Insect-Born Disease education

## Medium/Low Priority

- Religious/Spiritual Institutions
- Recreational Services and Opportunities
- Schools and Youth Services

# ENVIRONMENTAL CONCERNS



- Insect-Borne Disease
- Forest Maintenance
- Nuisance Species
- Water Resources

# ENVIRONMENTAL STRENGTHS



- Forested Land
- Water Resources
- Open Space

# ENVIRONMENTAL ACTIONS

## High Priority

- Mosquito Management
- Water resource Protection
- Open Space Stewardship

## Medium/Low Priority

- Open Space and Recreation Plan

## NEXT STEPS FOR DUDLEY

- Draft report with assistance from CMRPC
- Final report submitted to EOEEA by June 30, 2020
- Dudley receives “MVP Community” designation
- Annual reporting by Core Team
- Develop and Apply for MVP Action Grants

# ACTION GRANTS

- Next round expected in spring 2020
- Up to \$2 million for an individual community
- Up to \$5 million for regional projects
- One year grant cycle (typically) July 1<sup>st</sup>- June 30<sup>th</sup>
- 25% Match - Cash or In-kind

[www.mass.gov/municipal-vulnerability-preparedness-mvp-program](http://www.mass.gov/municipal-vulnerability-preparedness-mvp-program)

[www.communityresiliencebuilding.com](http://www.communityresiliencebuilding.com)



# Questions and Comments

# CONTACT US

- Dudley Project Manager,
  - Jon Ruda, [jruda@dudleyma.gov](mailto:jruda@dudleyma.gov)

## CMRPC Project Leader,

- Peter Peloquin, [ppeloquin@cmrpc.org](mailto:ppeloquin@cmrpc.org)
- Andrew Loew, [aloew@cmrpc.org](mailto:aloew@cmrpc.org)

## Regional Coordinator, Executive Office of Energy and Environmental Affairs

- Hillary King, [Hillary.King@mass.gov](mailto:Hillary.King@mass.gov)



**Thank you**

