



Millis

Community Resilience Building

Summary of Findings

January 8, 2019



ACKNOWLEDGEMENTS

The project was conducted by the Metropolitan Area Planning Council (MAPC) with funding from Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Planning Grant. This Community Resilience Building workshop is occurring in conjunction with the Town of Millis's Open Space and Recreation Plan (OSRP) as an expanded scope.

Special accolades to Robert Weiss for managing the program and diligence in securing attendee for the workshop, to the Millis Public Library for providing the venue and to all the participants who enthusiastically and diligently worked to create a more resilient Millis.

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Millis Existing Conditions

The Town of Millis is a small, suburban industrial town in the Charles River Valley, incorporated in 1885, approximately 30 miles from Boston. First settled in 1658, the town's early economy was based largely on agriculture and grazing and remained a prosperous agricultural town throughout the century. In the next century, the town's character shifted toward industrial development but has only experience modest population growth over time. Commercial and industrial development as well as critical facilities are clustered and largely located in the center of Town^{1,2} and with nearly 60% of its land area as forest and wetlands, Millis still retains its small-town, rural landscape.

An important defining characteristic of Millis is its rivers and wetlands. The Charles River and its tributary, Bogastow Brook, surround the Town on one-third of its boundary. These are all prone to flooding in severe storms or localized flooding during more frequent, minor storms. The Army Corps of Engineers in the 1970s and 1980s had the foresight to protect several thousand acres of land in the upper Charles River basin for flood protection both locally and regionally down river. However, the increased use of impervious surface and development have presented challenges on stormwater management and preserving water quality in the Town's water bodies. Nonetheless, Millis has taken innovative strides toward protecting its Town from the impacts of climate change. In 2018, the Town implemented a Stormwater Utility and completed an update to the Natural Hazard Mitigation Plan. They also passed the Community Preservation Act in 2006 providing a dedicated source of funding for open space and recreation, affordable housing, and historic preservation. Millis is also a state-designed Green Community. Through and in conjunction with the Municipal Vulnerability Preparedness program, the Town is updating its Open Space and Recreation Plan with a climate change assessment and resilient strategy to prioritize parks, open space, and nature-based solutions toward climate resilience. The Town is well-poised toward implementing resilience strategies to preserve its community through climate change.

Climate Change in Millis

In the last five years, Massachusetts has experienced increasingly more frequent and severe weather events. Record-breaking snowfall in 2015, an extensive and severe drought in 2016, the warmest year on record in 2017, and four Nor'easters in one month and flooding comparable to the Blizzard of 1978 in 2018 are just some examples. Further, the fall of 2018 had the greatest amount of precipitation since 1890 when precipitation was first recorded (Figure 1).³ Climate change is not imminent but affecting the people and cities and towns of the Commonwealth today.

Because of its location in the watershed of the largest river in Massachusetts, the Charles River, precipitation events, drought, and changing precipitation patterns will have an important impact on the community and down-river communities as well. For the Boston area there has been a 10% increase in precipitation over the past 50 years⁴ and a 71% increase in the amount of rain that

¹ Planners Collaborative, Inc. 2001. Town of Millis Master Plan.

² MAPC. 2018. Town of Millis Natural Hazard Mitigation Plan Update

³ Blue Hills Observatory

⁴ Blue Hills Observatory

falls in the top 1% events from 1958 – 2012.⁵ In the future, Millis will likely experience more frequent and intense precipitation events (Figure 2

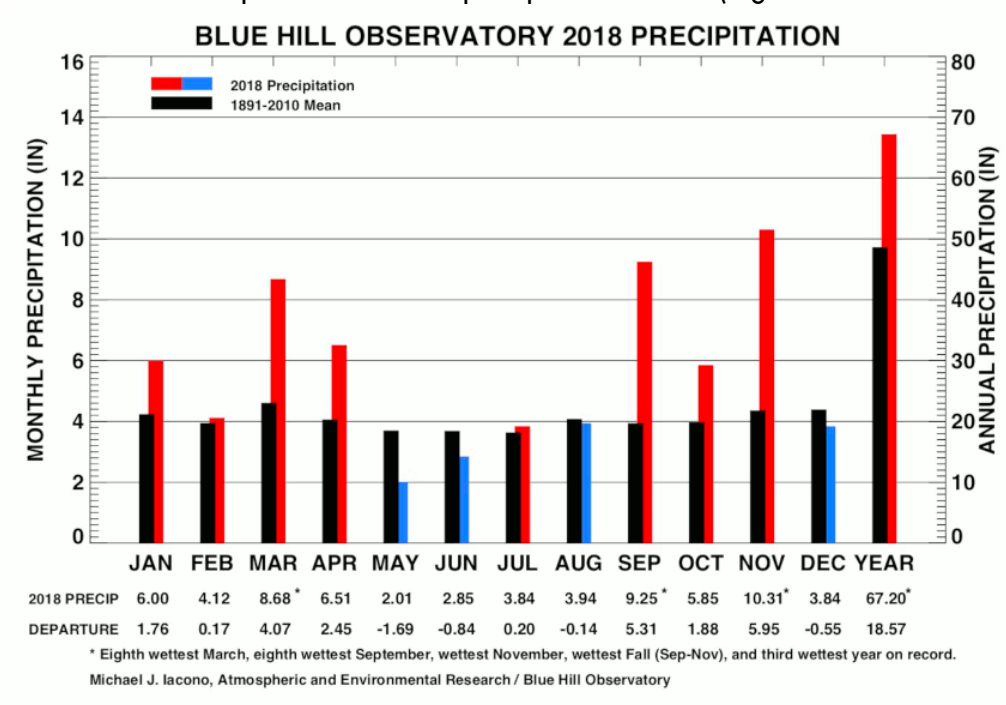
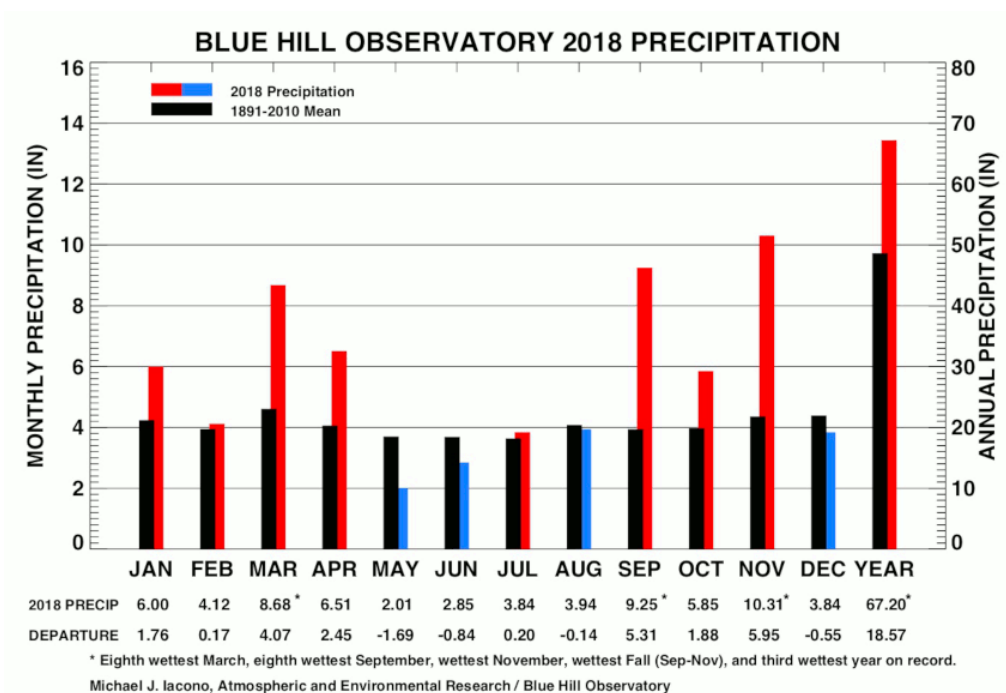


Figure 2). By mid to late century, Millis can anticipate

Figure 1 Record breaking precipitation in the fall of 2018 as collected at Blue Hill Observatory.

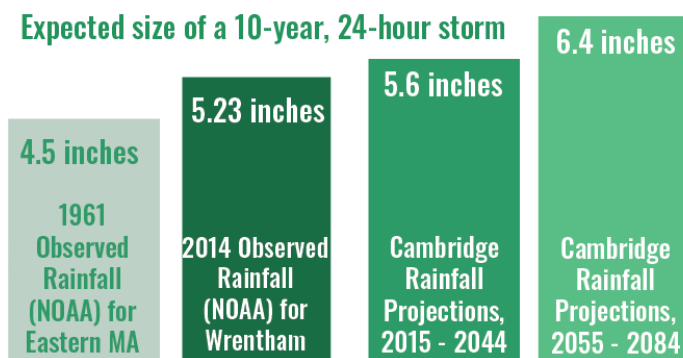


⁵ USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

Figure 2 Design storm projections for a 10-year, 24-hour storm.

More Large Storm Events

Storm drains built for 1961 standards will be inadequate

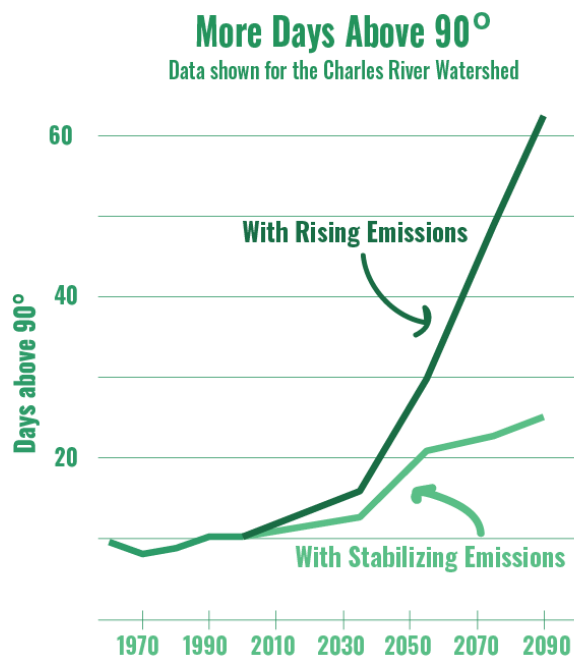


9-10 days with precipitation events with greater than one inch of rain or an increase in total precipitation from 45 inches to 48 in the Charles River Basin.⁶ With aged stormwater infrastructure and increases in severity and intensity of precipitation, flooding could have a major impact on the town. With a 1% annual chance flood, 65 households could be displaced creating total property damage of over \$6 million.⁷

Figure 3 Temperature change and projections for days over 90° with two emission scenarios.

⁶ www.Resilientma.org

⁷ HAZUS model 100-year Flood in Millis, MA. 2018. As described in MAPC. 2018. Town of Millis Natural Hazard Mitigation Plan Update.



Global temperatures increased by nearly 2 degrees in the last century⁸ and even small changes in temperature have widespread and significant changes to our climatic system. For example, the northeast has experienced a 10-day increase in the growing season in since 1980.⁹ Due to its 60% tree canopy cover and only 8% impervious surface, urban heat island is not a significant issue for the Town of Millis. There are two current “hot spots” where the temperature is significantly hotter than surrounding areas. These include the commercial area on route 109/Main Street containing large retail venues like Roche Brothers and Ann & Hope and large parking lots. With climate change, the Town can expect 40-50 days over 90 degrees by mid to late century, a significant increase from the baseline of 7 days today (Figure 3).

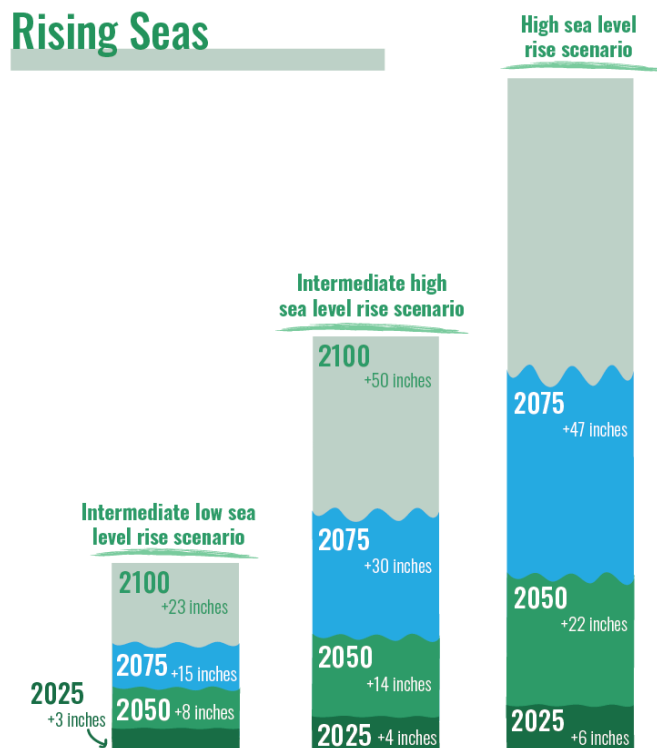
Finally, though not a coastal community, sea level rise could have important implications on the future community of Millis if significant loss of coastal land promotes migration to more inland suburban Boston communities such as Millis. With a high emission scenario, Massachusetts could experience between 11-14 inches of sea level rise by 2030, the same amount of sea level rise experienced in the last 100 years.¹⁰ The amount of sea level rise increases to 50-90 inches by mid to late century (Figure 4). Hence, the amount of emission reduction measures we pursue will have a significant impact on the extent to which Millis experiences climate migration.

⁸ USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

⁹ Knuckel, K.E., D.R. Easterling, K. Hubbard, and K. Redmond. 2004. Temporal variations in frost-free season in the United State: 1895-2000. *Geophys. Res. Lett.* 31:L03201.

¹⁰ National Atmospheric and Oceanic Administration. Boston Tide Gage. <https://water.weather.gov/ahps2/hydrograph.php?wfo=box&gage=bhbm3>

Figure 4 Sea Level Rise projections from the Northeast Climate Science Center based on emission scenarios.



Millis is currently challenged with localized flooding in roads, water quality and stormwater management challenges, and loss of electricity during severe storms. However, the Town and its residents are committed to a resilient future and strong community in the face of climate change. Through the Commonwealth of Massachusetts's Municipal Vulnerability Preparedness program, Millis can mitigate the impacts of natural hazard and climate change in a community-based, multi-disciplinary approach that ensures its vitality in the years to come.

Community Resilience Building Workshop

Millis received a grant from the Massachusetts Executive Office of Energy and Environmental Affairs to participate in the Commonwealth's Municipal Vulnerability Preparedness (MVP) program. The program provides supports for municipalities to plan and implement key climate resilience actions using a community-based, multi-disciplinary, participatory planning effort through the Community Resilience Building (CRB) platform.¹¹ The grant also provided funding for an expanded scope to pursue an Open Space and Recreation Plan



(OSRP) with a climate change assessment and resilient strategy. Millis had not completed an OSRP since 1999. Millis contracted with the Metropolitan Area Planning Council (MAPC) to administer the MVP program and the OSRP with the community. The process was guided by a core team that also serves as its Open Space and Recreation Plan Core Team, providing synergy, alignment, and efficiency in both projects.

Participants were identified using guidance from the CRB Workshop Participant Worksheet¹² and MAPC's best practices in ensuring equity in climate adaptation planning.¹³ The Millis Energy Manager led a robust and personalized outreach campaign to invite over 50 participants to the workshop. This effort was supported the Town Administrator who also sent out an urgent message to invitees urging them to participate given their expertise and importance of the program. Millis gathered 33 participants across 14 municipal departments, the school, library, health department, Council on Aging, political leaders, and environmental stakeholders. Participants were assigned to small teams in a manner that maximize the diversity of sectors in any one given table. The goal in this method was to enhance different perspectives and identify resiliency opportunities that solved multiple vulnerabilities across sectors.

The Core Team outlined the following objectives for its MVP and CRB participatory planning event:

1. Understand connections between ongoing issues, hazard, and local planning and actions in your Community. Define top climate hazards.
2. Identify and map vulnerabilities and strengths of people and places, both buildings and natural environment/parks.
3. Develop and prioritize actions that reduce vulnerabilities and reinforce Millis strengths.
4. Identify opportunities to advance actions that further reduce the impact of hazards and increase climate resilience in Millis.

¹¹ www.CommunityResilienceBuilding.com

¹² https://docs.wixstatic.com/ugd/29a871_7f4a484414be4e5f87d1041de9c8524f.pdf

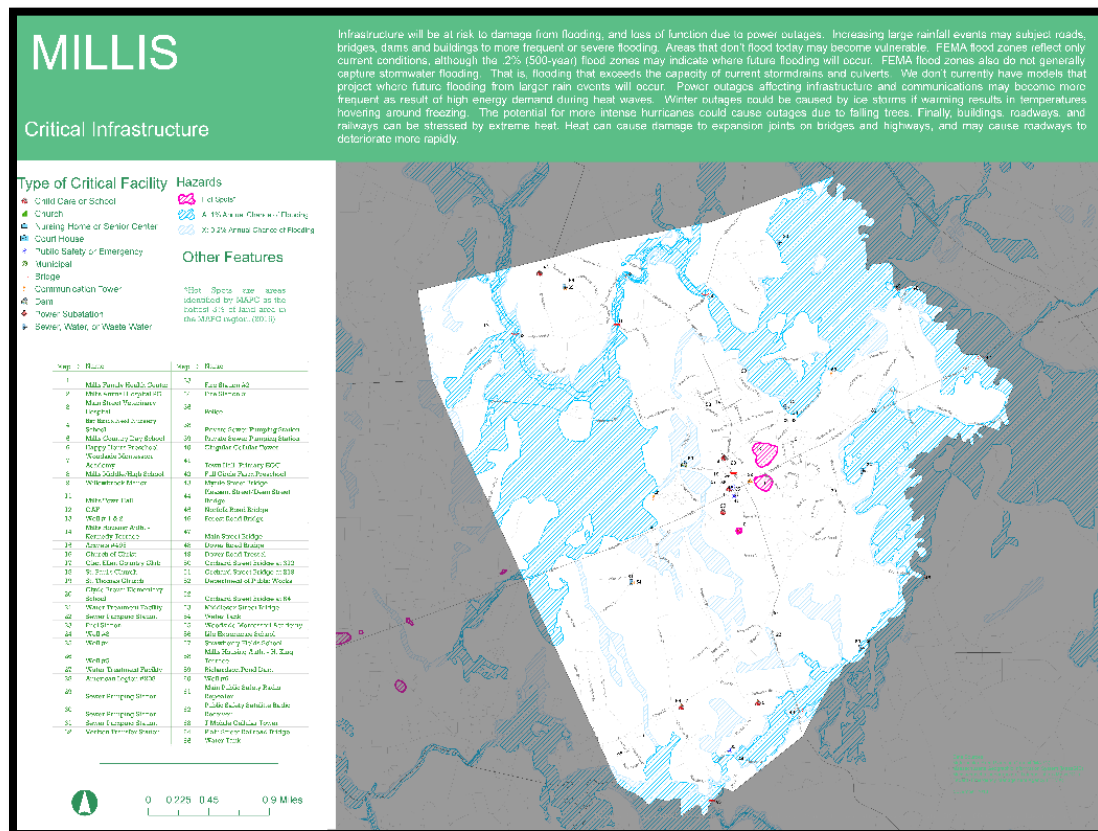
¹³ <https://www.mass.gov/files/mapc-equity-and-climate-planning-mvp-webinar.pdf>

MAPC led and facilitated the workshop with four CRB-trained individuals. MAPC provided an introduction to climate change, climate observations and projections, and overview of the CRB workshop procedures and goals via presentation (Appendix A). Thereafter, participants were then introduced to Millis's climate vulnerability to temperature, precipitation, social vulnerability, natural assets, solutions, and open space via "musical" learning boards. In their assigned small groups, participants rotated to learning stations for guided instruction and discussion on each of the aforementioned topics led by each of the MAPC facilitators. Appendix B contains the learning boards for each of the topics.

Climate change data used to inform Millis's risk and vulnerability came from the following sources:

- (i) the Northeast Climate Science Center,
- (ii) National Oceanic and Atmospheric Administration,
- (iii) Cambridge Climate Change Vulnerability Assessment,
- (iv) The Boston Research Advisory Group,
- (v) Massachusetts Office of Coastal Zone Management, and
- (vi) Blue Hill Observatory and Science Center.
- (vii) Fourth National Climate Assessment 2018
- (viii) Metropolitan Area Planning Council (urban heat island, population projections)
- (ix) American Community Survey
- (x) Town of Millis Natural Hazard Mitigation Plan Update. 2018

Figure 5 Millis small group working map.



Furthermore, each small team had a table map (Figure 5 and Appendix B) that identified Millis's Critical Infrastructure, 1% Annual Chance Flood, locally identified hazards from the Natural Hazard Mitigation Plan Update and areas of extreme heat.¹⁴

Because the Town of Millis is performing its MVP and OSRP concurrently, CRB participants had the opportunity to learn about the OSRP process, learn about Millis's Parks and Open Space Inventory, and provide feedback on the challenges of Millis's park system and the goals for open space in Millis (Appendix B).

Participants brought a wealth of knowledge and expertise from their respective yet diverse local experiences and fields and engaged in a consensus-building effort that gathered to solve the problem of climate change. After identifying the Town's vulnerabilities and identifying and prioritizing actions in their small groups using the CRB Risk Matrix (Appendix C), the participants reconvened to vote on their overall top priority actions as a large group. The final voting results are in Appendix D.

This report serves to provide a summary of findings from Millis's one-day CRB workshop on January 8, 2019. The prioritized actions in this plan represent a collective and collaborate effort to address climate resiliency and natural hazard mitigation from a community-based participatory approach.

¹⁴ MAPC uses land surface temperature data during the hottest periods of the summer months in 2016 to ascertain how likely an area may experience the urban heat island effect. We represented the area in Millis that outlines the top fifth percentile of land surface temperature of the 101 communities in Metro Boston.

Summary of Findings

Top Hazards and Vulnerable Areas

The Core Team identified top hazards for the community of Millis prior to the workshop. These hazards were determined by challenges the Town has already experienced from recent events, long-standing issues, and alignment with the Town's Natural Hazard Mitigation Plan Update. These top hazards have already affected stormwater management, road flooding, disruption in services, and risks with downed trees and loss of electricity.

Town of Millis Climate Hazards include:

- Extreme Heat/ Heat Waves
- Inland and Riverine Flooding
- Extreme Cold and Severe Winter Storms (ice storms, tornados, Nor'easters, blizzards)
- Drought/Fire

These hazards pose greater risks in some areas of the Town than others. Table 1 summarizes participants identified areas of significant concern:

Table 1. Millis areas of concern, vulnerable to identified hazards.

Millis Areas of Concern			
Neighborhoods	Society	Infrastructure	Environment
Charles River at Route 109	Senior Citizens	Wells	Wetland Stress to Flooding, Drought, and Toxic Exposure
Charles River at Dover Road	Teenagers	Town Buildings and Schools	Tree Canopy
Causeway Street Area	Veterans	Septic and Sewer	Loss of Open Space with Development
Center of Millis	Young Students with Disabilities	Route 109 Dover Road Bridge	Vector-Borne Disease
Cliquot Site	People Living Alone	Senior Housing, Senior Facilities, Assisted Living Facilities	Environmental Regulations and Industry Growth
		Municipal Information Technology and Servers	

Current Concerns and Challenges Presented by Hazards

With one third of its boundary being the Charles River and 28% of its area water bodies and wetlands¹⁵, extreme precipitation and changing precipitation were the source of challenges that Millis faces today and into the future. Inland flooding and stormwater management have been an ongoing challenge for the Town of Millis and climate change projections of more frequent and intense precipitation events raises the concern. Though Millis has significant acreage of natural lands serving as flood storage, extreme changes in precipitation regimes with climate change will stress those systems ultimate reducing their flood storage capacity and increasing the extent of riverine flooding.

Extreme weather events created cause for concern and challenges for the Town's people, technical infrastructure, and drinking water/wastewater infrastructure. Vulnerable populations included seniors, teenagers, veterans, low income individuals and those living alone. Climate change stressors can reduce resident's health, well-being, or financial security with ongoing stressors of flooding, heat, and storms.

Specific Categories of Concerns and Challenges

Inland and Riverine Flooding

Flooding is one of Millis's top category of concern. According to participants, it is widespread with a few areas that are of significant concern, the Causeway, the Route 109 Bridge over the Charles River at the boundary of Millis and Medfield, and the Dover Road Bridge over the Charles River. Participants both in Millis and Medfield in their CRB workshop were concerned about the integrity of the bridge on route 109 and the potential flooding of the Charles River in that area which would dissect an important transportation and emergency access corridor. CRB participants stressed working collaboratively with Medfield and the State to improve the bridge, design the bridge toward climate change projections flood design standards and protect the integrity of the wetlands in that area. Causeway Street is prone to flooding by a tributary to the Charles River. Insufficient culverts, excessive precipitation, and beavers were identified as main concerns in this area.

Though Millis has 1,731 acres of Charles River Natural Valley Storage Area (land owned and/or managed by the Army Corps of Engineers as flood storage land), the wetlands in the Charles River watershed have undergone stress related to changing precipitation regimes. These include the drought of 2016 and the excessive precipitation of 2018-2019 that has left wetlands submerged for approximately six months. This combined with potential toxic contamination from flooding raised concerns about the integrity of the wetlands services and flood storage capacity in the future. With increased stress during extreme changes in precipitation, wetlands could transform to more open water systems, creating a loss of land and further inland flooding.

Stormwater Management

Millis has have been working diligently to comply with National Pollution Discharge Elimination System (NPDES) requirements to reduce non-point source pollution and phosphorous loading into the Charles River and the tributaries feeding it. Stormwater infrastructure capacity remains a top concern for participants. Many participants noted insufficient and undersized culverts, capacity of the stormwater infrastructure to handle extreme precipitation events and the need to create new regulations for stormwater reduction on new development. As costs are increasing for NPDES

¹⁵ 2005 Land Use Data. MAPC

compliance for the Town and the aged stormwater infrastructure that exists, participants noted the importance of natural infiltration to minimize costs and stress to the infrastructure, including incentives and retrofits to achieve more natural infiltration. One participant noted the need to do asset mapping of the existing stormwater infrastructure. Water quality and aquifer contamination from runoff were important concerns.

Vulnerable Populations

Other major concerns were of the people of Millis, in particular seniors, teenagers, low income individuals, individuals living alone, and veterans. Climate change stressors can reduce their health, well-being, or financial security. CRB participants raised concerns about lack of air conditioning, transportation services, and reduced adaptive capacity to financial pressures from property loss/damage before, during, and after extreme weather events. Seniors have the additional stress of affordability on fixed income in Millis. Currently, housing price is high and supply is low combined with increasing tax and cost of living burdens, CRB participants raised concerns that climate change could displace their senior population.

For community connectivity, participants noted limited communication via cell phones for seniors and limited use of social media for town communications. Further, there is a lack of sufficient programming and facilities for both seniors and teenagers, important for connecting to the Town and to each other. Finally, participants noted an insufficient supply of services for mental health and disabilities, both conditions for which climate change can create extreme challenges. Participants noted the Town needed a mental health clinician during these times of stress.

Drinking Water and Waste Water Systems

The drought of 2016 stressed many municipal drinking water supplies, including Millis's, though supply is not generally a concern, future climate projections could cause stressors to this functioning system. Concerns around drinking water were mostly around flooding and well pump station resiliency. Specifically, participants were concerned of aquifer contamination and/or bacterial exposure during flooding and the viability of pump stations before and after emergencies/extreme weather events with electricity loss.

Residents raised concerns about the capacity of the Charles River Pollution District, the regional wastewater system, as more residents are seeking to connect to sewer. Participants questioned individual septic systems viability in a changing climate. Excessive precipitation raises the water table rendering a more shallow depth to ground water limiting septic leachate area. With less area, there is reduced microbial activity needed to properly filter wastewater potentially releasing fecal coliform and phosphorus into water bodies. With more frequent freeze/thaw cycles with climate change, participants raised concern of the efficacy of mounded septic systems during these conditions.

Information Technology Infrastructure

Many participants noted that the technological and communications infrastructure in Millis's municipal services and facilities are in need of upgrade and replacement. During extreme weather events, electricity loss is common. Participants want to ensure that equipment is functioning for communications, emergency response, and day-to-day operations. Concerns included a need for more radio repeaters for public safety, updating the Town's servers, and creating redundancy in the information technology system. Further, upgrades from copper communications to Voice Over Internet Protocol (VOIP) or fiber optics are needed for more effective communications and operations in the Town.

Tree Canopy and Open Space

Nearly 60% of Millis is covered by tree canopy, making it an important asset and liability to the Town with climate change. Participants had concern about the future tree canopy and forest on both public and private land. With climate change, participants noted that trees will become more stressed from flooding, drought, and overall warming temperatures/longer growing seasons. New tree pests and diseases are a vulnerability for the Town's forests and trees and oaks, maples, ash, and white pine were the identified as trees of concern. One of the most important concerns for the Town of Millis for open space was the Charles River Flood Valley Storage protected land. Approximately 1,300 acres of land is under the Army Corp's control or management and participants wanted better communication and collaboration with the Army Corps particularly since the viability of these lands to protect the Town and downstream river cities and towns from climate change is of the utmost importance.

Approximately 30% of its total land area is protected land. Combined with widespread wetlands and floodplains, community growth is limited. Participants recognized nature-based solutions and protected land as a key climate change solutions and resilience strategy, however, some participants wanted to ensure economic and community growth in the Town of Millis. Specifically, ensure that environmental regulations don't impede industry and that growth and land protection are balanced.

Centralized Location of Municipal Facilities

Identified as both a strength and a vulnerability, many municipal facilities such as the school, Town Hall, Library, and Emergency Operations are located in the center of Town. Also located there are the Senior Center, housing authority, and senior housing. In the event of an extreme weather event and/or emergency, all operations are centrally located, however geographically they are vulnerable if an event were to occur there.

Current Strengths and Assets

Millis has a solid foundation of assets, services, people and infrastructure that will serve to enhance its resiliency through our changing climate. CRB participants highlighted and sought to enhance these with best practice resiliency efforts to ensure a vibrant future for their community. Assets identified by participants are described as follows.

Natural assets and ecosystem services.

Participants identified many of Millis's natural features and open space as an important asset toward its climate resilience. These include vast amounts of contiguous open space, protected flood storage areas, and a widespread tree canopy covering the Town. Millis contains over 2,300 acres of protected parks, open space, and conservation land. The Town also has 1,984 acres of BioMap Core Habitat, most of which is protected, and 2,316 acres of BioMap Critical Natural Landscape.¹⁶ These are

contiguous tracts of exemplary ecosystems more resilient to climate change stressors and provide important ecosystem services for resilience such as flood control, clean water, clean air, and cooling. Furthermore, participants also highlighted related strengths including the Community Preservation Act for acquiring and protecting more land and updating its Open Space and Recreation Plan, the first time in 20 years. In addition to their ecological and resilience benefits, participants appreciated the recreation and beautification value of Millis's parks and open space as well as the farms in the community not only as added open space, but an important and well-loved community amenity.

Millis also has a prominent tree canopy across the town mitigating the impact of extreme heat, stormwater, and air pollutants from vehicles. The trees in Millis sequester 3,700 tons of carbon/year work over \$634,000 a year. The trees mitigate 360,000 pounds per year of air pollutants (CO, NO₂, O₃, PM 2.5, SO₂, PM 10) worth \$571,000 a year, and avoid 30 million gallons of runoff a year saving \$270,000 a year in avoided stormwater runoff expenses.¹⁷

Wetlands and water bodies such as the Charles River were important natural assets identified by participants. Though a noted challenge in collaboration, participants appreciated the Charles River Natural Valley Storage area owned and/or managed by the Army Corps of Engineers as important flood storage not only for Millis but also for downriver communities. The wetlands bylaw is strong and water supply is not a significant issue because of these land features. In addition, participants noted Millis has a strong aquifer and want to ensure this natural asset is protected from contamination.



Richardson's Pond, Millis, MA. Photo credit CityData

¹⁶ http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Millis.pdf

¹⁷ iTree Landscape. Processed on Dec. 2018

Stormwater Management

Millis has demonstrated strong leadership in addressing one of their most significant challenges, stormwater management. The Town regularly manages stormwater infrastructure such as catch basin cleaning, street sweeping, leaf litter clean, and constructing and maintaining the Town's sewer and drainage systems. In addition, the Town hosts community clean-up days and voted to institute a stormwater utility in November 2017. The Town performed a strong public outreach campaign on stormwater management, best practices, and implementing a utility. Residents receive rebates for pervious surfaces on their property calculated in their stormwater utility. In addition, the Town has provided public information on impervious surface at the parcel level through an online GIS viewer available on its website (Figure 6).

Figure 6 Millis GIS Online Viewer with Stormwater Utility Impervious Area.



Resilient Infrastructure

Millis has invested in new municipal infrastructure that is able to withstand the impacts of climate change and participants stressed that regular maintenance and upgrades will ensure their long-term resilience. New infrastructure in Millis includes the elementary school, a rehabilitated fire station, and a new library which include green and sustainable features. For example, the new library has solar panels and the new elementary school has raingardens and bioswales. In addition, Millis is a State-designated Green Community implementing energy-reduction retrofits and measures to mitigate its climate impact. Millis also has a water storage tank for periods of short drinking water supply.

Community services

A notable outcome of the CRB workshop is the extent of community services in Town. Participants noted many active civic groups and organizations which community-building programs. These include the churches, the Lions Club, the Garden Club, and the Millis Forum. The Town of Millis funds the food pantry at the church, and the senior center, its newsletter and senior van staffing received accolades by participants. Millis contains many centers for assisted living and senior living which at important benefits to its residents. Most notably, participants mentioned the

positive life experiences at Millis's schools, a mechanism that builds strong community cohesion and a draw for new residents.

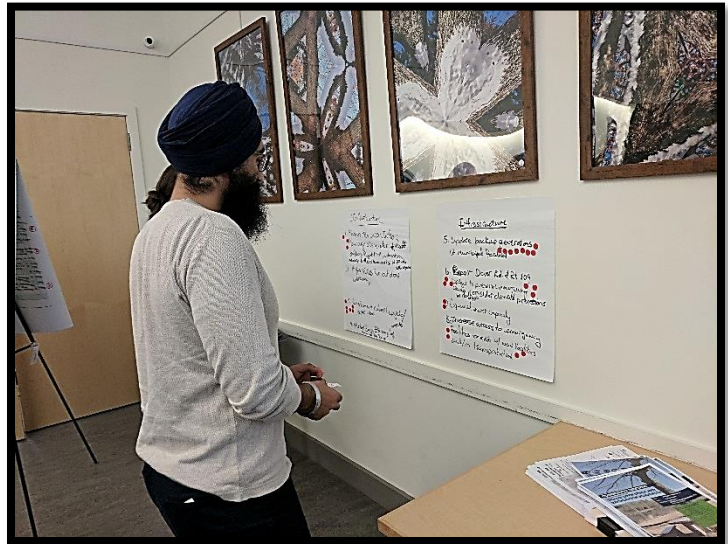
Emergency Preparedness

Participants noted the excellent emergency response services in the Town of Millis, important for protecting the community during current winter storms and those projected to be more frequent and extreme with climate change. The Town has emergency response plans for all its buildings and effective emergency communication strategies, including Swift Reach 911. Most importantly, the police have contact names for seniors with medical challenges to further enhance critical emergency response.

Top Recommendations to Improve Resilience

Once participants completed their CRB risk matrices in their small groups, each group built consensus on their top five priority actions from their risk matrices for each of the three categories: infrastructure, society, and environment. Participants then reconvened as a large group to report on their top resiliency actions. These actions were documented and collated on posters. Participants then voted as a large group with stickers on their top three resiliency actions from the collated actions (Figure 7). Appendix D illustrates the voting results. From this exercise, the Millis CRB participants designated the following as their top priority actions, listed in order of importance:

Figure 7 Millis CRB participant voting on the final top priority actions.



Society

- Create heating and cooling centers with communication and transportation for vulnerable populations, especially seniors.
- Build a senior center and youth center together.
- Create youth programs for environmental stewardship and more youth programs for engagement.
- Build a new senior center.
- Build redundancy in emergency communications and IT infrastructure. Seek outside funding.
- Protect students at school from urban heat island and stormwater with innovative design strategies.
- Increase medical facilities, emergency health facilities. Prioritize the Cliquot property for site redevelopment and reduce urban heat island with new development there.
- Connect seniors to Norfolk County Sheriff's Program for cell phones.
- Launch a public education campaign on climate change to seniors.
- Prevent displacement of seniors from increased cost of living and tax burdens.
- Set up appropriate environment in school system for students with disabilities or special needs.
- Increase/diversify communication strategies to seniors.

Infrastructure

- Expand sewer capacity.
- Implement culvert upgrades and stormwater infrastructure repair plan.
- Update backup generators at municipal facilities.
- Maintain energy efficiency of municipal buildings.
- Repair Dover Road and Route 109 bridges to preserve emergency access. Consider climate projections in design.

- Reduce stormwater inflow, manage stormwater runoff, and modify building regulation and education. Manage well contamination from stormwater runoff with private well inspections.
- Increase access to emergency facilities with new facilities and/or transportation.
- Enact higher rates for outdoor watering.

Environment

- Balance nature-based resilience solutions with economic growth to ensure Millis remains a vibrant community in the face of climate change.
- Prevent wetland contamination with stormwater management.
- Enhance communication with Army Corps of Engineers in cooperation with the State on Charles River Natural Valley Storage Areas.
- Enact a public education program on water resources and use-reduction of chemicals and toxics.
- Encourage smart growth development.
- Maintain natural assets and trees, especially from disease.
- Create a tree bylaw to manage and protect trees on private property.
- Complete a drought management plan.
- Launch a public education campaign on minimizing exposure to vector-borne diseases.

Table 2 summarizes participant's recommended actions for climate resiliency and their priority ranking/timeframe by small group and category in order of importance.

Table 2 Summary of all actions by priority, category, and small group.

Table	Category	Action Items	Priority	Time	Table Priority
Green	Environment	Create a tree bylaw and/or incentives to replace Trees	High	Long	Yes
Green	Environment	Implement Green Infrastructure	High	Ongoing	
Red	Environment	Enhance communications with Army Corps in cooperation with the State and State Representative	High	Short	Yes
Red	Environment	Promote best practices and public information on stormwater runoff/ pollution risk to wetlands.	High	Short	Yes
Red	Environment	Perform study to maximize revenue out of limited land supply. Understand best practices.	High	Ongoing	Yes
Red	Environment	Add security fence. Monitor. Add public information.	High	Short	
Yellow	Environment	How are parks, open space, and gardens maintained? Is there adequate funding for maintenance? What are the expenses?	High	Short/On going	Yes
Yellow	Environment	Maintenance of dead trees.	High	Short/On going	Yes
Yellow	Environment	Drought management plan for drinking water supply.	High	Ongoing	Yes
Yellow	Environment	Engage in stormwater runoff management to prevent contamination.	High	Ongoing	Yes
Green	Infrastructure	Add generators and Electric Vehicle Charging Stations	High	Short	Yes
Green	Infrastructure	Need to reach seniors (via mail and phone). Improved notification system	High	Ongoing	
Green	Infrastructure	Assess condition of roads and bridges. Implement improvements	High	Ongoing	
Green	Infrastructure	New Senior Center location an better transportation	High	Long/On going	
Green	Infrastructure	Plan for new school	High	Low	
Green	Infrastructure	Enact "green" improvements. Ongoing maintenance of new systems Plan for long-term upgrades and mitigate on-site flooding.	High	Ongoing	
Red	Infrastructure	Create a relief/cooling center	High	Short	Yes
Red	Infrastructure	Addressed in capital plan and discussion with state. One year before closing. Encourage state to consider climate change in design.	High	Short	Yes
Red	Infrastructure	Enhance with climate emergency preparedness. Pursue Funding	High	Short	Yes
Red	Infrastructure	Install air conditioning and cooing in middle and high schools	High	Short	

Table	Category	Action Items	Priority	Time	Table Priority
Red	Infrastructure	Contact utilities to discuss climate mitigation	High	Short	
Red	Infrastructure	Procure and Install	High	Short	
Yellow	Infrastructure	Reduce inflow. Create regulations on building. Retrofits and Green Infrastructure with incentives, education, and tax.	High	Long	Yes
Yellow	Infrastructure	Rebuild, upgrade, and add capacity with new development. Perform study on culvert replacement. Consider Aquatic Habitat in culvert upgrades.	High	Short/On going	Yes
Yellow	Infrastructure	Upgrade and maintain water system. Initiate outdoor watering rates.	High	Ongoing	Yes
Yellow	Infrastructure	Upgrade and improve southwest drainage systems. Install pervious pavement	High	Long	
Yellow	Infrastructure	Ensure redevelopment has state of the art stormwater management and green infrastructure. Offer incentives	High	Ongoing	
Green	Society	Consider opportunities for expanded services such as MBTA services. Provide transportation for all.	High	Ongoing	Yes
Red	Society	Connect people to Norfolk County Sheriff Program for providing cell phones for seniors.	High	Short	Yes
Red	Society	Provide teenage programs with environmental organizations/benefits. Work with schools. Stewards to conservation lands.	High	Short	Yes
Red	Society	Ensure appropriate building and environment to support vulnerable students	High	Short	Yes
Red	Society	Evaluate security of building. Check on residents/center during climate events	High	Ongoing	
Red	Society	Install air conditioning. Provide Heat Relief Center. Ensure Seniors are checked on during emergencies.	High	Ongoing	
Red	Society	Provide MS4/Stormwater Utility Rebates and Tax Relief	High	Short	
Red	Society	Need a town mental health clinician. See Willow Brook	High	Short	
Red	Society	See Willow Brook	High	Short	
Yellow	Society	Provide services such as transportation needs such as during power outages. Provide Emergency management focus on Seniors. Education on cooling and heating centers for seniors such as Town Hall, Schools, Library. Use	High	Short/On going	Yes

		diverse communication strategies such as Reverse 911 but not the newspaper.			
Table	Category	Action Items	Priority	Time	Table Priority
Yellow	Society	Provide services such as transportation needs such as during power outages. Provide Emergency management focus on Seniors. Education on cooling and heating centers for seniors such as Town Hall, Schools, Library. Use diverse communication strategies such as Reverse 911 but not the newspaper.	High	Short/On going	Yes
Yellow	Society	Provide services such as transportation needs such as during power outages. Provide Emergency management focus on Seniors. Education on cooling and heating centers for seniors such as Town Hall, Schools, Library. Use diverse communication strategies such as Reverse 911 but not the newspaper.	High	Short/On going	Yes
Yellow	Society	Build a new Senior Center	High	Short	Yes
Yellow	Society	Provide services such as transportation needs such as during power outages. Provide Emergency management focus on Seniors. Education on cooling and heating centers for seniors such as Town Hall, Schools, Library. Use diverse communication strategies such as Reverse 911 but not the newspaper.	High	Short/On going	Yes
Red	Infrastructure	Promote Norfolk Sheriffs' Phone Program. Add community Rooms with computer areas at senior housing	M/H	Short	
Red	Environment	Install Sensors and perform studies on septic system status and alternatives	Medium	Ongoing	
Green	Infrastructure	More Locations with backup generators (all major services in center make the Town vulnerable if the power goes out). Add solar and micro grid	Medium	Long	Yes
Green	Infrastructure	Replace/Maintain Culverts. Use Green Infrastructure Improvements	Medium	Ongoing	
Green	Infrastructure	Consider expansion of public water supply	Medium	Long	
Yellow	Infrastructure	Periodic Inspections by Board of Health. Investigate connection to Town water system	Medium	Ongoing	Yes

Table	Category	Action Items	Priority	Time	Table Priority
Yellow	Infrastructure	Most new buildings are efficient but they are very large and more often used. Perform maintenance and keep up with state of the art energy efficiency.	Medium	Ongoing	Yes
Yellow	Infrastructure	Ongoing Maintenance	Medium	Ongoing	
Yellow	Infrastructure	Manage for multiple pests-ticks, mosquitos, and poison ivy	Medium	Ongoing	
Yellow	Infrastructure	Investigate possible enlargement and containment	Medium	Ongoing	
Yellow	Infrastructure	Investigate private OWTS connection to Town Sewer. Continue Testing and Inspection of onsite systems.	Medium	Low	
Green	Society	Redevelop Site for housing and medical services (Urgent Care)	Medium	Low	
Red	Society	Explore multi-generational programs-Seniors with youth and young families.	Medium	Ongoing	
Red	Society	Revisit zoning, stormwater, and districts to accommodate for growth	Medium	Ongoing	
Yellow	Society	Perform scheduled maintenance. Educate public on Climate Change	Medium	Ongoing	
Yellow	Society	Provide Public Outreach and Education on Climate Change	Medium	Ongoing	
Green	Infrastructure	Keep Environmental Impact work ongoing	Medium	Ongoing	
Green	Infrastructure	Replace/Maintain Culverts. Use Green Infrastructure Improvements	Medium	Ongoing	
Green	Infrastructure	Consider expansion of public sewer	Medium	Long	
Green	Infrastructure	Look to construct urgent care practice	Medium	Low	
Red	Infrastructure	Elevate Roadway	Medium	Long	
Red	Infrastructure	Account for maintenance/repair/protection in 5 year capital improvement plan.	Medium	Ongoing	
Red	Society	Investigate need for more recreation resources and location	Medium	Ongoing	
Red	Society	Perform study for a dedicated facility	Medium/H igh	Ongoing	
Yellow	Society	Communications on emergencies and education on climate change.	Medium/H igh	Short	
Yellow	Society	Communication and mobilization on emergencies and extreme weather events.	Medium/L ow	Ongoing	
Yellow	Environment	Maintain flow of the river, particularly with logs and dead trees	Low	Ongoing	
Yellow	Environment	Education-plantings and prevention	Low	Ongoing	
Green	Infrastructure	Continue improvements to communications system	Low	Short	

Table	Category	Action Items	Priority	Time	Table Priority
Red	Infrastructure	Town program to disrupt dams and relocate seasonally	Low	Long	
Red	Infrastructure	Work with Utility on land management to minimize brush fires. Perform fire prevention education.	Low	Long	
Red	Infrastructure	Bring to State's attention	Low	Long	
Red	Infrastructure	Size culvert design relative to future water flows.	Low	Long	
Red	Infrastructure	Enhance drainage. Consider environmental conservation and maintenance with field improvements.	Low	Long	
Red	Infrastructure	Install Fiber and consider underground utilities.	Low	Long	
Yellow	Infrastructure	Encourage Solar Development	Low	Long	
Green	Environment	Install new charging stations	Low	Short	
Green	Environment	Control offsite, non-point pollution sources	Low	Ongoing	
Green	Infrastructure	Some new towers approved in Town	Low	Short	
Blue	Environment	Encourage environmental smart growth and green infrastructure solutions			
Blue	Environment	Encourage environmental smart growth and green infrastructure solutions			Yes
Blue	Environment	Encourage environmental smart growth and green infrastructure solutions			Yes
Blue	Environment	Plant Trees more resilient to warming temperatures and manage forests for disease.			Yes
Blue	Environment	Public Education. Explore new technique for vector borne disease management-sterilizing mosquitos			Yes
Blue	Environment	Maintain positive communication			Yes
Green	Environment	Complete and Implement the Open Space and Recreation Plan			
Green	Environment	Create a tree bylaw and/or incentives to replace trees			
Green	Environment	Check on Status of Remediation			
Red	Environment	Strength minimizing car use, vulnerable to storms with centralized location			
Red	Environment	Promote best practices and public information on stormwater runoff/ pollution risk to aquifer.			
Red	Environment	Addressed in infrastructure			
Red	Environment	Get report from local arborists. Provide public information. Use Tree			
Yellow	Environment	Combine Tree management and maintenance in drought management plan.			Yes

Table	Category	Action Items	Priority	Time	Table Priority
Blue	Infrastructure	Create a management plan for flooding and stronger wetlands protection			Yes
Blue	Infrastructure	Do an overall assessment of backup power needs			Yes
Blue	Infrastructure	Need more sewer capacity at Charles River Pollution District. Use alternative technology like composting toilets and mounded systems			
Blue	Infrastructure	Investigate beaver issue. How do we address beavers on private property? Require planning for evacuation.			
Blue	Infrastructure	Work with Medfield and State on repair plan			
Blue	Infrastructure	Communication and advocate for better maintenance and trimming			
Blue	Infrastructure	Energy Storage. Costs need to come down. Solar on Buildings			
Blue	Infrastructure	Stormwater Utility			
Blue	Infrastructure	Flooding addressed for now. Expansion would improve an existing good program.			
Red	Infrastructure	Appropriate Equipment required			
Blue	Infrastructure	Invest in maintaining, seek grants			
Blue	Society	Improved outreach and communication			
Blue	Society	Education seniors on climate risks and self-care options			
Blue	Society	Bridges			
Green	Society	Create a system for communication for vulnerable populations			
Green	Society	Create a system for communication for vulnerable populations			
Green	Society	Create a system for communication for vulnerable populations			
Green	Society	Implement Housing Production Plan			
Green	Society	Create a system for communication for vulnerable populations			
Green	Society	Create a system for communication for vulnerable populations			
Green	Society	Identify options in the Open Space and Recreation Plan			
Green	Society	Continue to upgrade facilities			
Red	Society	Promote positive life experience at Millis's Schools			

CRB Workshop Participants

MAPC provided a modified CRB participant worksheet to the Core Team which built an invitation list of 50 potential attendees. This included elected officials, 10 municipal department managers, emergency response, four appointed committees, religious organizations, regional environmental organizations, the business community, and political leaders. In addition, Millis broadened the invitation to residents of Millis via social media and flyer postings at municipal buildings around town. Table 3 lists the CRB participants and their affiliation.

Table 3 Millis participants in the Community Resilience Building workshop on January 8, 2019.

Last	First	Table	Affiliation
Barry	Wendy	Green	Chair of the Library Trustees
Bouret	Karen	Green	Operations Manager
Carl	Brooks	Yellow	Council on Aging
Dooley	Shawn	Blue	House of Representatives
Galwao	Lindsey	Green	Representing David Linksy House of Representatives
Giampietro	Michael	Red	Millis Building Commissioner, Chief Building Inspector
Gibbons	Craig	Yellow	Chair, Energy Committee
Goldberg	Andrew	Green	Kleinfelder
Gustafson	Nancy	Red	School Superintendent
Guzinski	Mike	Blue	Town Administrator
Harris	Cynthia	Green	Clarksdale CG
Howie	Steven	Red	Council on Aging
Johnston	Carol	Red	Finance Director
Jurmain	Pete	Red	Acting IT Director
Kumpf	Lisa	Blue	Charles River Watershed Association
LeBlanc	Jaikaur	Red	Chair, Millis Board of Health
Macfarlane	Megan	Green	Resident
Maier	Jean	Yellow	Resident
McCaffery	James	Blue	Board of Selectmen
McKay	Jim	Blue	Director Public Works
McVeigh	John	Blue	Public Health Officer
Riley, Esq.	Nicole	Blue	Millis Planning Board

Last	First	Table	Affiliation
Sennott	Suzanne	Red	
Soffayer	Chris	Red	Police Chief
Standley	Camille	Yellow	Planning Board /Con Comm/CPC
Streck	Kathleen	Green	Energy Committee
Tolson	Kim	Yellow	Library Director
Weiss	Bob	Yellow	Energy Manager
Wiggin	Terry	Yellow	School Business Manager
Dumont	Paula	Blue	Assessor
Harris	Jasmine	Green	Clarksdale CG
Horkay	Peter	Yellow	Resident
Rogersail	Carllin	Red	Representing Senator Rausch

CORE TEAM MEMBERS

Robert Weiss
Loring Barnes
Jim McKay
Chief Rick Barret
Chief Chris Soffayer
Mike Guzinski
Kris Fogarty
John McVeigh
John Engler
Julie Wood
Ram Charan Khalsa

Energy Manager
Member, Board of Selectmen
Director, Public Works
Fire Department
Police Department
Town Administrator
Recreation Director
Director of Public Health
Millis Schools, Director of Operations
Charles River Watershed Association
Conservation Commission

Citation

Metropolitan Area Planning Council. 2019. *Town of Millis Municipal Vulnerability Preparedness Program. Community Resilience Building Workshop Summary of Findings*. Millis, Massachusetts.



Presentation Outline


1. Municipal Vulnerability Preparedness
2. Open Space and Recreation Plan and MVP
3. Climate Change: Observations and Projections



Photo Credit Tangerini Farms




Municipal Vulnerability Preparedness (MVP)



Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Municipal Vulnerability Preparedness Program

State and local partnership to build resiliency to climate change



The Municipal Vulnerability Preparedness (MVP) program helps communities in Massachusetts 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 take action to reduce risk and build resilience

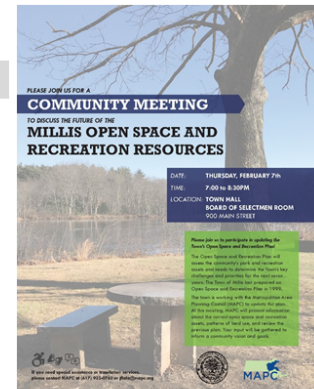
<https://www.mass.gov/files/mvp-training-opening.pdf>



Open Space and Recreation Plan (OSRP)

1. What is an Open Space and Recreation Plan?
2. Why is it being updated?
3. What is the process for updating it?

	Nov	Dec	Jan	Feb	Mar	Apr	May	June
MVP	Data Analysis and Materials	Workshop Prep and Workshop	Produce final report	Final Report				
OSRP	Project Kickoff	Data collection and assessment	Prep of draft plan	Draft plan	Final plan			

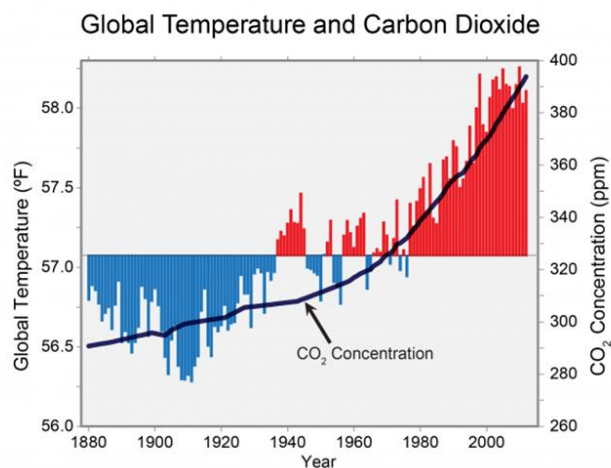
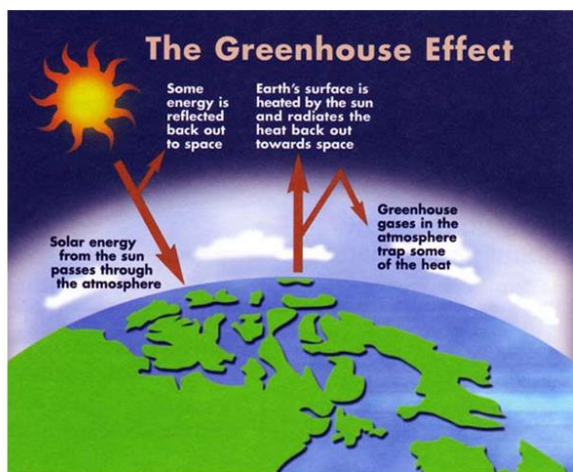


Open Space and Recreation Plan (OSRP)

1. Why combine the MVP and OSRP?
2. What is the benefit of a combined process?



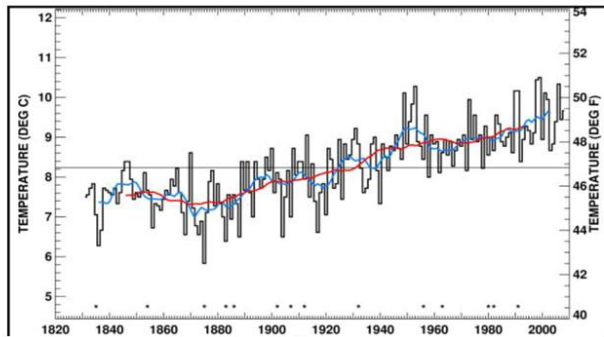
Climate Change: Process



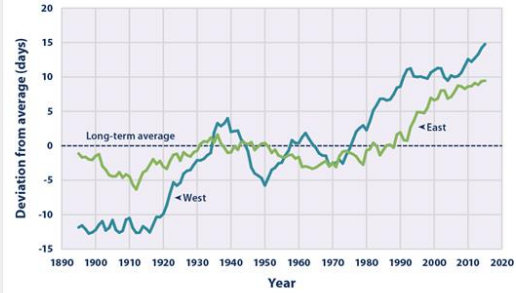
Temperature change: Observed

Blue Hill Observatory Annual Temperature, 1831-2008

Source: Michael J. Iacono (from MA Climate Change Adaptation Report 2011)



Length of Growing Season in the Contiguous 48 States, 1895-2015: West Versus East



Data source: Kunkel, K.E. 2016 update to data originally published in Kunkel, K.E., D.R. Easterling, K. Hubbard, and K. Redmond, 2004. Temporal variations in frost-free season in the United States: 1895-2000. *Geophys. Res. Lett.* 31:L03201. For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.

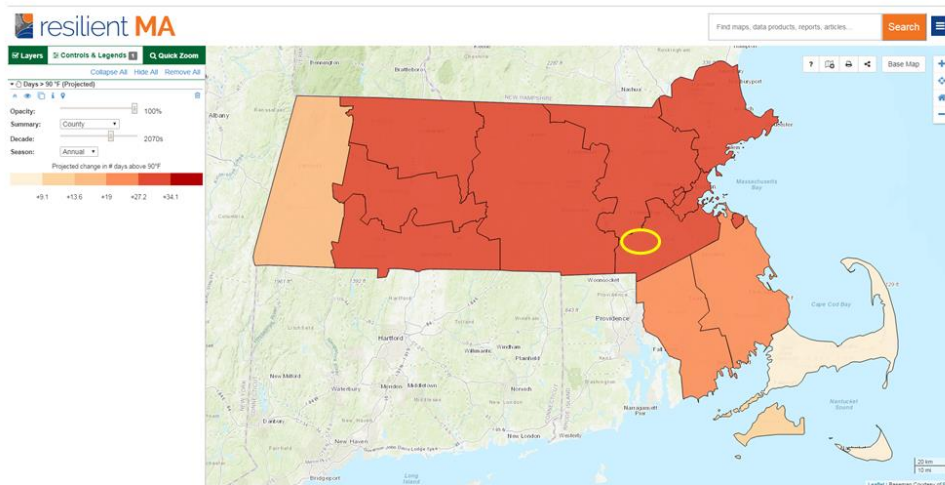


Source: U.S. EPA Climate Change Indicators 2016

For the Northeast United States: temperature increased by almost 2 degrees, between 1895 and 2016 (US National Climate Assessment 2017)



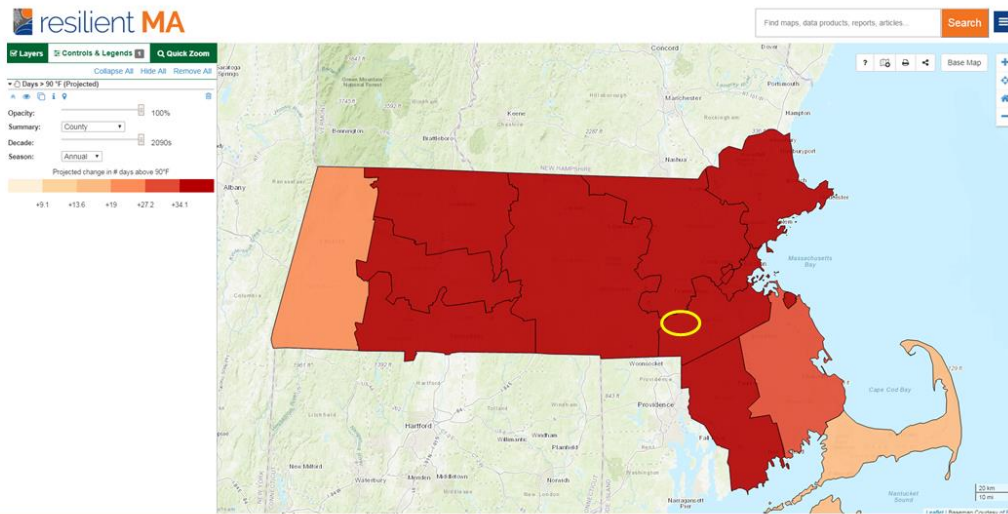
Temperature change: Projected 2050



Nearly 39 days over 90 degrees annually by mid-century.
www.resilientma.org/map



Temperature change: Projected 2090

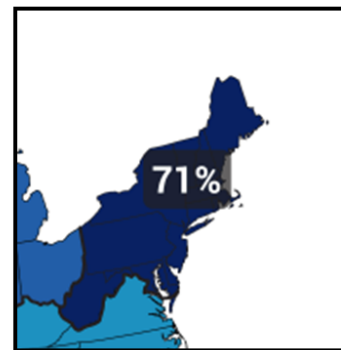
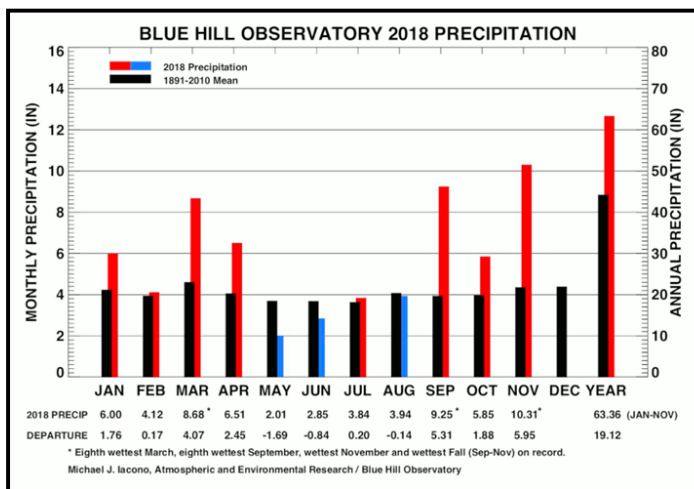


Nearly 50 days over 90 degrees annually by 2090.

www.resilientma.com/map



Precipitation Change: Observed



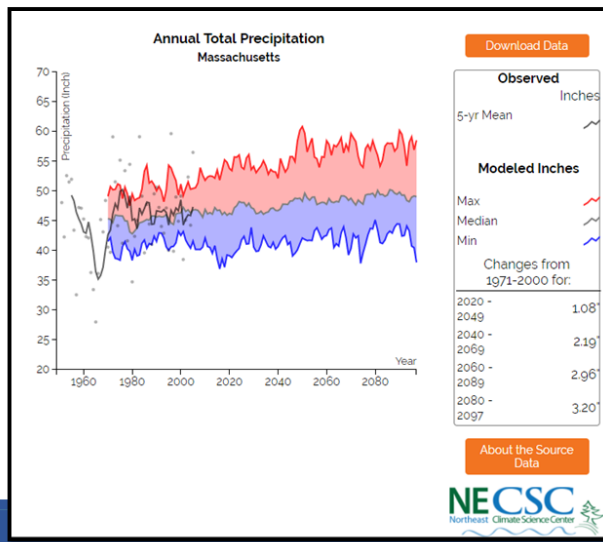
For the Northeast United States:
71% increase in the amount of
rain that falls in the top 1% events
from 1958 – 2012.

Source: US National Climate Assessment 2016

Boston Area 10% increase over last 50 years



Precipitation Change: Projected

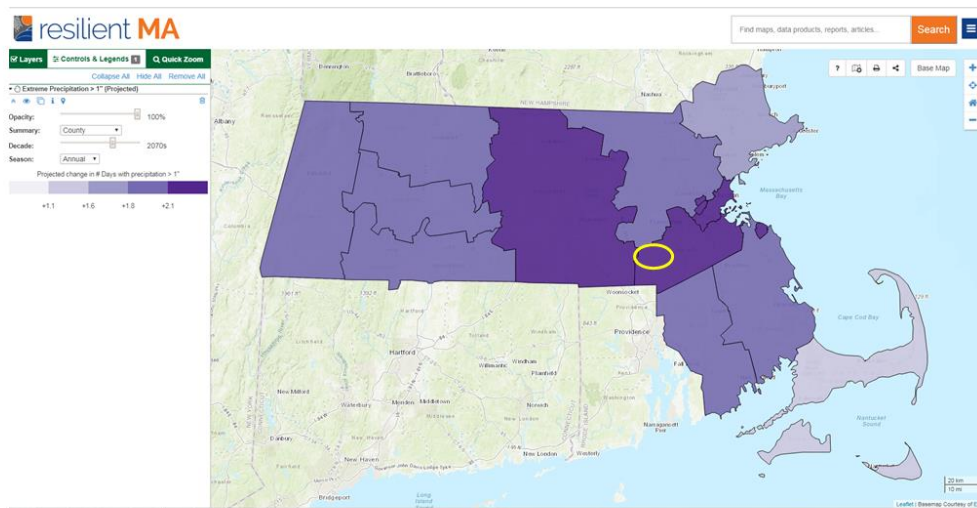


- Baseline annual precipitation Norfolk County is 46.7 inches.
- Precipitation is 51 inches statewide by 2090.
- Greatest increase in precipitation during the winter months.

www.resilientma.org/map



Precipitation Change: Projected 2050

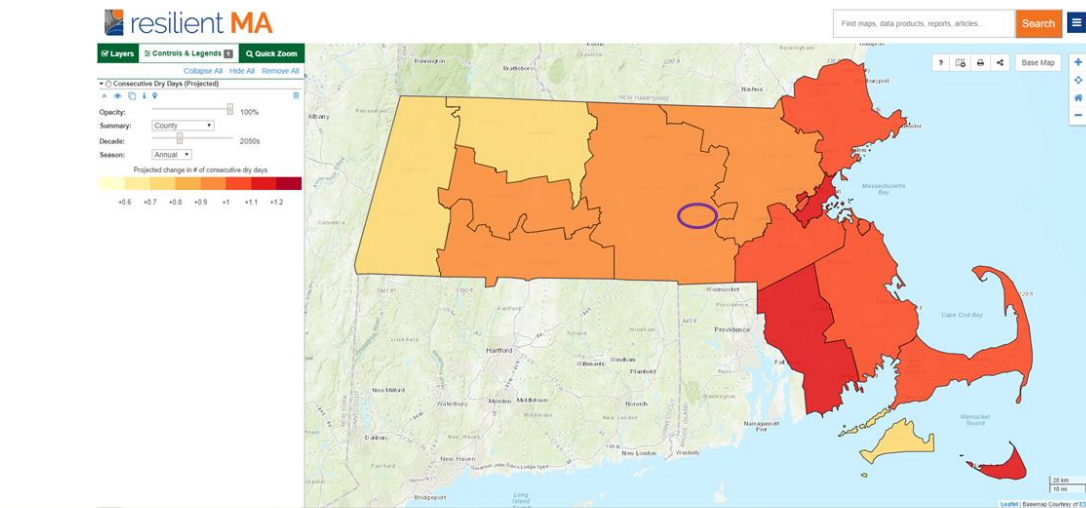


Precipitation events with > 1 inch of rain increases to 8 days baseline to days annually by 2050.

www.resilientma.org/map



Precipitation Change: Project Dry Days 2050



Consecutive Dry Days increases from 17 days to 18 days annually by 2050.

www.resilientma.org/map



Step 1: Identify Risk Areas and Community Strengths

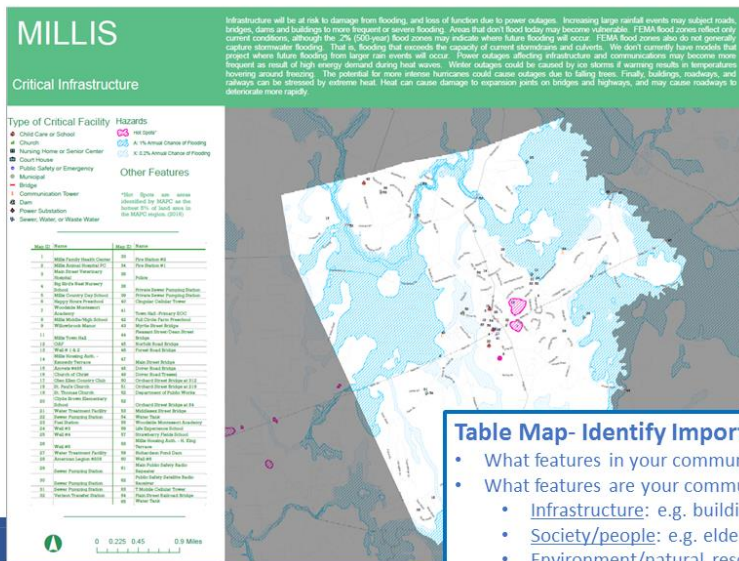



Table Map- Identify Important Community Features

- What features in your community are most vulnerable to weather-related impacts?
- What features are your community's biggest strengths relative to climate impacts?
 - Infrastructure: e.g. buildings, roads, bridges, wells
 - Society/people: e.g. elderly citizens living in flood zones
 - Environment/natural resources: e.g. wetlands, protected land in flood zones

[illegible]

Gloucester Community Resilience Building Risk Matrix

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



www.CommunityResilienceBuilding.org

				Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)			Priority	Time	
				Coastal Flooding/ Storm Surge/ Sea Level Rise	High Winds	Extreme Cold/ Winter Storms/Snow	Extreme Heat/ Fire/ Drought	H - M - L	Short Term or Ongoing
Infrastructural Features	Location describe here in words or mark it on map	Ownership identify private, public, etc.	V and/or S						
Example: Waste water treatment plan									
	Essex Ave.	City	V	ACTIONS - list below: Gloucester CC Adaptation Plan : Use existing protective berm and topography to build up from. Design, permit and construct a higher berm along the southern side of the property. Build a flood wall along Route 133 with a temporary closure at the property entrance.			H	S	

1. Develop Actions – How should we reduce vulnerability and/or reinforce strengths?
2. Prioritize – Are actions high, medium, or low priority?
3. Determine Urgency – Are actions ongoing? Or a short-term or long-term step?

MVP Instructions

Ground Rules

- Everyone has an equal opportunity to contribute
- Everyone is an expert; respect others' point of view.
- Respect limited time.
- Please work to complete the worksheet and tasks. Your input is important!
- Please turn off your cell phone.



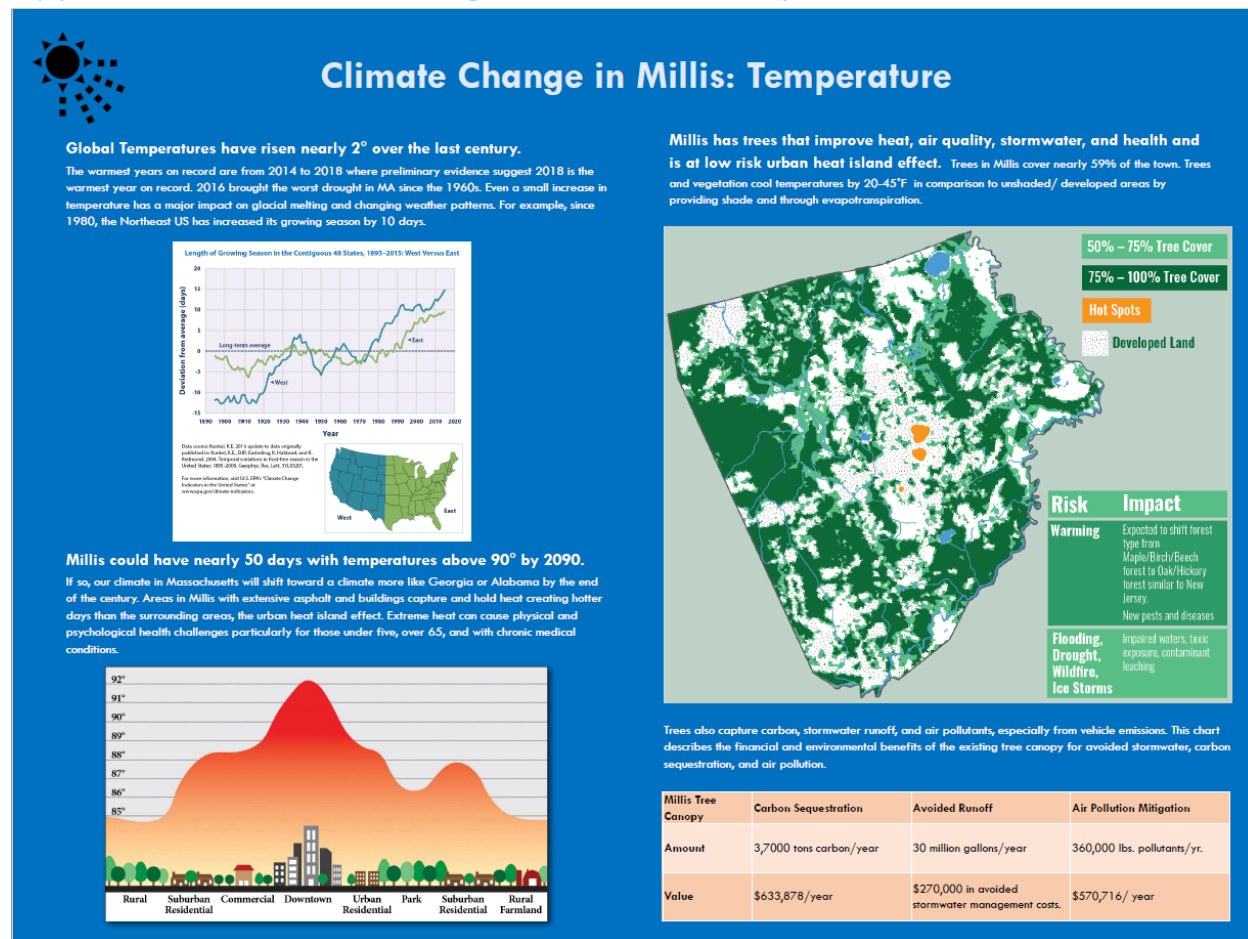
Thank you for your participation!



Darci Schofield, Senior Environmental Planner
DSchofield@mapc.org



Appendix B –Climate Change Posters and Maps





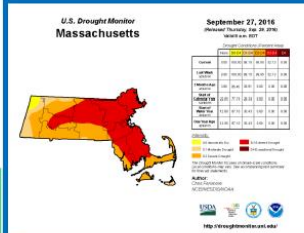
Climate Change in Millis: Precipitation

There has been a 10% increase in precipitation in Boston area since 1970. In the last 50 years, precipitation in the Northeast US increased 71% in the amount of rain that falls in the top 1% of storm events. However, increased temperatures may cause increase incidence of drought during the summer months.

More Large Storm Events

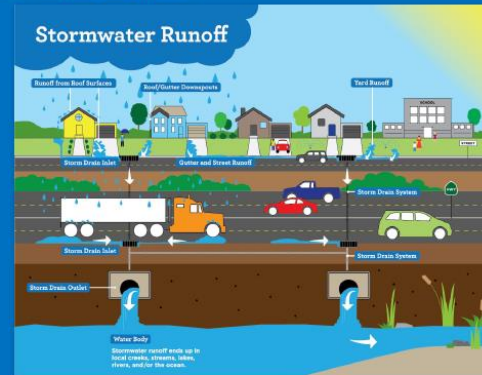
In addition to increasing annual precipitation, climate change will bring more large rain and snow events. This will lead to more stormwater flooding, as most stormwater drainage is not sized for larger rain events. 10-year, 24-hour storms refer to the 24-hour rainfall total for the biggest storm expected in a 10-year period.

Storm drains built for 1961 standards will be inadequate



More precipitation will risk Millis's rivers, stormwater infrastructure, and public health.

Climate Change including more frequent and intense storms are likely to cause more flooding events, which can increase stormwater runoff from impervious surfaces (such as roofs, houses, asphalt, and other buildings) can increase or introduce new pollution to our water, both rivers and drinking water. Increased precipitation can also overwhelm the design capacity of the existing stormwater systems, causing localized flooding. Phosphorus runoff into the Charles River and its tributaries is the greatest concern for the Town of Millis in addition to comply with the Clean Water Act and its Municipal Separate Storm Sewer System Permit issued by the EPA.



Potentially toxic, Blue-Green Algae Bloom in the Charles River caused primarily by Phosphorus runoff.



Stormwater Drain overwhelmed by extreme precipitation event.

Estimated value of economic and infrastructure loss and damage in Millis as a result of a 1% and 0.2% Annual Chance Flood. Modeled on HAZUS, 2018.

Flooding Event	1% Chance 100 Year Flood	0.2% Chance 500 Year Flood
Building Characteristics		
Estimated total number of buildings	2,911	
Estimated total building replacement value (2010 \$)	\$1,061,000	
Building Damages		
# of buildings sustaining moderate damage	13	12
# of buildings sustaining extensive damage	0	1
# of buildings substantially damaged	0	0
Population Needs		
# of households displaced	65	26
# of people seeking public shelter	23	70
Value of Damages		
Total property damage	\$6,090,000	\$7,870,000
Total losses due to business interruption	\$10,000	\$20,000



Climate Change in Millis: People

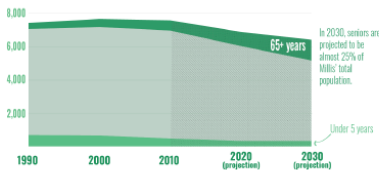
Who is most at risk from climate change impacts?

Social vulnerability refers to social, economic, demographic, or health factors that may make some people less able to adapt to or recover from climate change impacts or extreme weather events. Climate resilience strategies should prioritize first helping those at greatest risk.

Older Adults and Young Children

Adults over 65 and children under 5 are more likely to develop health problems on very hot days or during heat waves. Older adults are also more likely to have disabilities or mobility constraints and may need additional assistance during emergencies. They are also more likely to live alone than younger adults.

Millis Recent and Projected Population by Age



Households in Poverty

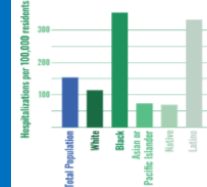
4.7% ± 4% Households in Millis that are below poverty level

Households that earn poverty-level incomes are more susceptible to financial shocks triggered by extreme weather, which can cause long-lasting financial insecurity and can make it hard to secure safe shelter, sufficient food, and medical care. A four-person household earning less than \$24,563 is below poverty level.

People with Health Conditions

People who are already in poor health are more likely to be harmed by hot weather and resulting poor air quality.

Massachusetts Asthma Hospitalizations

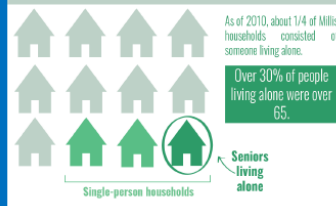


People who have certain health conditions: These may include older adults, very young children, pregnant women, people with disabilities, and/or people with chronic medical conditions. They may be more physically vulnerable to extreme heat and poor air quality caused by climate change. Individuals with mobility constraints, such as people with disabilities and seniors, may need additional assistance with emergency response.

People who have difficulty adapting to, preparing for, or recovering from extreme weather events:

Characteristics such as income, language, and household status can cause people to be more at risk to climate change. For example, low-income people and families may have greater financial shocks after extreme weather events if their homes are damaged, if their work transportation is impaired by weather, if their medical needs are not met due to loss of transportation or financial shocks.

People Living Alone



People in social isolation, such as individuals living alone, single-parent households, or individuals with limited English-speaking abilities, can limit access to critical information, city resources, and social support systems.

People Who Work Outside

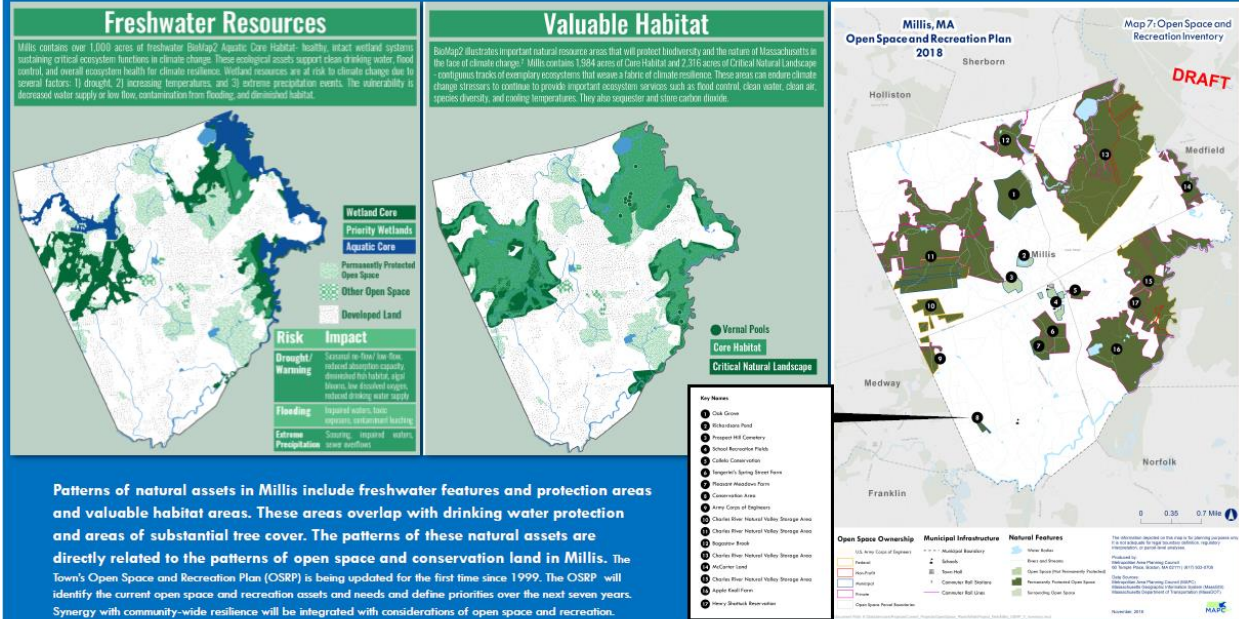


People who primarily work outside, such as parcel delivery people, construction workers, or farmers, may be at added risk from extra exposure to high heat and poor air quality.

People who live or work in vulnerable locations such as areas with historic and projected flooding, areas prone to heat islands and extreme heat, and neighborhoods prone to power outages. Outdoor workers, first responders, and those working in hot indoor environments are also vulnerable.



Climate Change in Millis: Natural Assets Millis Open Space and Recreation Plan



Patterns of natural assets in Millis include freshwater features and protection areas and valuable habitat areas. These areas overlap with drinking water protection and areas of substantial tree cover. The patterns of these natural assets are directly related to the patterns of open space and conservation land in Millis. The Town's Open Space and Recreation Plan (OSRP) is being updated for the first time since 1999. The OSRP will identify the current open space and recreation assets and needs and define priorities over the next seven years. Synergy with community-wide resilience will be integrated with considerations of open space and recreation.



Climate Change in Millis: Natural Assets Millis Open Space and Recreation Plan

Write your thoughts below and they will be used to inform the Open Space and Recreation Plan

What are the **main challenges** for open space and recreation amenities?

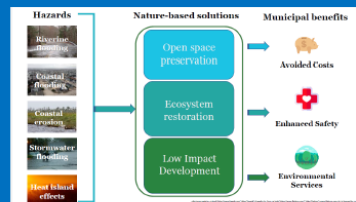
What should be the **primary goals** of the open space and recreation plan?



Climate Change in Millis: Solutions

What are your solutions for a healthy, vibrant, livable Millis through climate change?

As a member of the Millis community, you are all the experts. This workshop is seeking your input to protect the people and places of Millis most vulnerable to climate change. Below are some examples from plans that have addressed climate change and extreme weather events combined with some possible solutions. These can be used to help think of new climate resilience action items for Millis with this workshop.



Mitigation Measure	Priority 2018 Plan	Time Frame (2018-2023)
DROUGHT/ BRUSH FIRE RELATED HAZARDS		
Acquire ATVs to fight remote brush fires	High	2019
Cart Path Restoration	High	2019
Water Main Installation Causeway Street to Boggastowe Meadow	Low	2022
75- foot required setback regulation	Medium	2019
Public Education on Fire Prevention	High	2019
Investigate separate metering for outdoor watering	Medium	2018-2019
EXTREME TEMPERATURES		
Investigate cooling and warming centers, upgrades to serve the community, install a generator.	Medium	2019
Public education on cooling centers and warming centers.	High	2019
Site Design to increase tree plantings near buildings, increase the percentage of trees used in parking areas, and along public ways.	High	2018-2023
EXTREME WEATHER EVENTS RELATED HAZARDS (TORNADOS, HURRICANES, NOR'EASTERS, BLIZZARDS, ICE STORMS)		
Institute tree trimming program and collaborate with utilities.	Medium	2020
Increase the size of the salt shed.	Medium	2021
Evaluate public buildings to withstand snow loads.	Medium	2020
FLOODING		
Farm and Pleasant Street-Beaver Control	High	2018-2023
Dover Road Mitigation- Levy on the abutting Maple Swamp, repair culvert under route 109	High	2018-2019
Dover Rd. Mitigation-Floodgate on the upstream dam	High	2018-2020
Protection of Open Space-Acquire open space off Main Street, Tresca property, make recommendations on completing an OSRP	Medium	2018-2023
Update Open Space and Recreation Plan	High	2019-2020
Revisions to Development Bylaws and Regulations	Medium	2018-2023
Drainage Improvement/Retention Basin Village and Birch Street. Repave the road in 2018	High	2019-2020
Island Road-Road elevation and Culvert Enlargement	Low	2022
Larch Road-Road Elevation and Culvert Enlargement	Medium	2022
Water-Related Public Education on non-point pollution- Create a stormwater Enterprise fund for education and outreach to public.	Medium	2018-2023
CLIMATE CHANGE		
Implement Municipal Vulnerability Preparedness plan.	High	2019-2023
MULTI-HAZARDS/ EMERGENCY MANAGEMENT		
Emergency Communication for intra-operability especially with Police, Fire, and DPW. Upgrade from copper to fiber for radio repeaters, Upgraded from analog to digital.	High	2019

MILLIS

Critical Infrastructure

Infrastructure will be at risk to damage from flooding, and loss of function due to power outages. Increasing large rainfall events may subject roads, bridges, dams and buildings to more frequent or severe flooding. Areas that don't flood today may become vulnerable. FEMA flood zones reflect only current conditions, although the .2% (500-year) flood zones may indicate where future flooding will occur. FEMA flood zones also do not generally capture stormwater flooding. That is, flooding that exceeds the capacity of current stormdrains and culverts. We don't currently have models that project where future flooding from larger rain events will occur. Power outages affecting infrastructure and communications may become more frequent as result of high energy demand during heat waves. Winter outages could be caused by ice storms if warming results in temperatures hovering around freezing. The potential for more intense hurricanes could cause outages due to falling trees. Finally, buildings, roadways, and railways can be stressed by extreme heat. Heat can cause damage to expansion joints on bridges and highways, and may cause roadways to deteriorate more rapidly.

Type of Critical Facility Hazards

- Child Care or School
- Church
- Nursing Home or Senior Center
- Court House
- Public Safety or Emergency
- Municipal
- Bridge
- Communication Tower
- Dam
- Power Substation
- Sewer, Water, or Waste Water

Hazards

- Hot Spots*
- A: 1% Annual Chance of Flooding
- X: 0.2% Annual Chance of Flooding

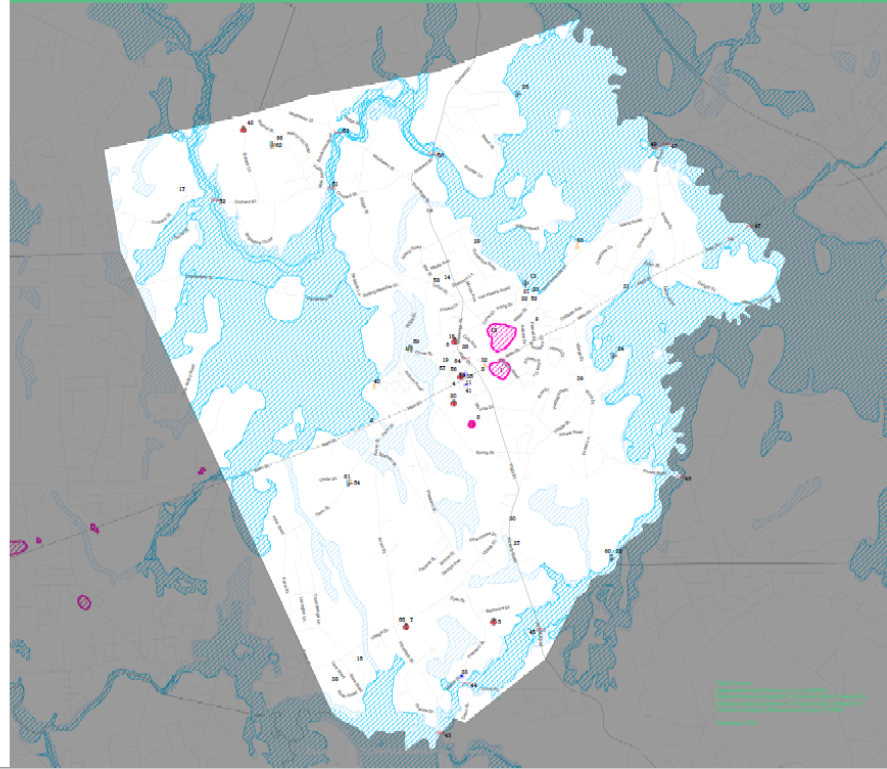
Other Features

*Hot Spots are areas identified by MAPC as the hottest 5% of land area in the MAPC region, (2016)

Map ID	Name	Map ID	Name
1	Millis Family Health Center	33	Fire Station #2
2	Millis Animal Hospital PC	34	Fire Station #1
3	Main Street Veterinary Hospital	35	Police
4	Big Birds West Nursery School	36	Private Sewer Pumping Station
5	Millis Country Day School	37	Private Sewer Pumping Station
6	Happy Hours Preschool	40	Cingular Cellular Tower
7	Woodside Montessori Academy	41	Town Hall - Primary EOC
8	Millis Middle High School	42	Full Circle Farm Preschool
9	Wilburbrook Manor	43	Myrtle Street Bridge
11	Millis Town Hall	44	Pleasant Street/Dean Street Bridge
12	CAF	45	Norfolk Road Bridge
13	Well #1 & 2	46	Forest Road Bridge
14	Millis Housing Auth. - Kennedy Terrace	47	Main Street Bridge
15	Annexa 4495	48	Dover Road Bridge
16	Church of Christ	49	Dorset Road Tunnel
17	Olson Ellen Country Club	50	Orchard Street Bridge at 312
18	St. Paul's Church	51	Orchard Street Bridge at 318
19	St. Thomas Church	52	Department of Public Works
20	Clyde Brown Elementary School	53	Orchard Street Bridge at 34
21	Water Treatment Facility	54	Middlesex Street Bridge
22	Sewer Pumping Station	55	Water Tank
23	Fuel Station	56	Woodside Montessori Academy
24	Well #3	57	Life Experience School
25	Well #4	58	Stonewall Public School
26	Well #5	59	Millis Housing Auth. - H. King Terrace
27	Water Treatment Facility	60	Richardson Pond Dam
28	American Legion #205	61	Well #6
29	Sewer Pumping Station	62	Main Public Safety Radio Receiver
30	Sewer Pumping Station	63	Public Safety Satellite Radio Receiver
31	Sewer Pumping Station	64	7 Mobile Cellular Tower
32	Verizon Transfer Station	65	Pain Street Railroad Bridge
		66	Water Tank



0 0.25 0.45 0.9 Miles



Appendix C- Workshop Risk Matrices

living alone - outreach
(Education Seniors
Investing IT communica

五

Trees - disease
Public Education
diseases



BLUE TABLE

Backup power needs
Bridges
Sewer capacity expansion

Millis Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org			
H.M. Likelihood for action over the short or long term (and Ongoing)				Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)			
V = Vulnerability 3 = Strength				Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire
Infrastructure Features	Location (describe here in words or mark it on map)	Ownership (identify private, public, etc.)	V and/or S	Priority	Time	H - B - L	
ACTIONS - list below							
Most facilities updated or new			S				
DPW - inadequate - not large enough - staff			V				
Middle/High - not immediate need			V				
T.H. / Schools - only partial generators - half			V	do overall assessment of backup power needs			
IT-EOC in town hall will need update - not immediate			V				
Causeway Rt. Floods - barriers			V	investigate beaver issue - private property evacuation planning			
Rt. 109 bridges - need updates			V	Dover Rd bridge - work w/ Hordfield + state on repair plan			
Rt. 109 - Floods - major transp.			V	Rt. 109 bridge - Funding issue			
Septic systems as water table rise			V	Rt. 109 Flood - no infrastructure fix - need report, plan stronger wetlands protection			
DEP grants to assess survey			V	District - increase sewer capacity - check road, mound systems			
maint. / stormwater utility			S	Millfield alt. technology compost toilet			
Stormwater costs - MS4 compliance			V	Stormwater utility			
Sewer capacity - as people move to sewer			V				
Senior center has Flooded - needs backup			V	Floods addressed for now			
electric delivery system - tree damage - insurance			V	would improve good program			
electric delivery capacity - heat waves			V	communication - push for better maintenance - training			
			V	energy storage - if needs to come down			
				solar on bldgs -			

not back
generators to full capacity

needed systems added pop. values

only 109 + Dover
capacity + expansion

YELLOW TABLE

Millis Community Resilience Building Risk Matrix									
www.CommunityResilienceBuilding.org									
H-M: Likelihood for action over the Short or Long term (and Timing)									
V = Vulnerability S = Strength									
Infrastructural Features	Location (describe here in words or mark it on map)	Ownership (identify private, public, etc.)	V or S	Top Priority Hazards (hurricane, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat waves, etc.)				Priority H-M-L	Time Short Long (years)
				Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire		
ACTIONS - list below									
Stormwater system	Town wide	Town	V	Reduce inflow - regulations on lots				H	L
Roadways - floods	109/115 Causeway Emment Rd	State/Town	V	Rebuild + Green Infra = incentives/edu. / pay				H	L
Wells - Town	High + Low water Tables		V/S	Upgrade + improve SW drainage systems					
Wells - Private	regulating color-coded		V/S	Pervious pavement					
Sewers	regulating color-coded		V/S	Upgrade/Maintain water system				H	O
septic systems	Titles	Town-wide	V/S	Outdoor watering - rules					
Water Tank -	Acorn St		S	BOH - inspections - periodic				M	O
Storage of Road Salt (DPM)	* Map		V	Potential connection to Town water system				M	L
Cultural issues - outdoor	Town wide (map)	Town	V	Testing/inspection				M	O
RR Right of Way -		Town/Private	V	Maintenance				M	S
Town - Buildings - Schools		Town	V/S	Possible embankment / containment				M	S
Heating & Cooling (Solar)		Town	V/S	Rebuild/upgrade / Additions - new dev't.				H	S/O
Potential Solar sites	GAF	Private	S	Consider aquatic habitat (study - Culv. Replacement)				L	L
Parks		Town	S						
Business District (Art spots)	Main St Downtown	Private	V	Most new bldgs - efficient but bigger more used				M	O
				Maintenance / Keep up w/ State of Art efficiency (scheduled)					
				Encourage solar development				L	L
				Mitigate Dicks - ticks / mosquitoes / poison ivy				M	O
				Refer to have State of Art SW Mgt. / G.I. Incentives				H	O

yellow

www.CommunityResilienceBuilding.org

Millis Community Resilience Building Risk Matrix

H-M-L priority for action over the Short or Long term (not QoQoQ)
V = Vulnerability S = Strength

Societal Features (people!)	Location describe here in words or mark it on map	Ownership identify private, public, etc.	V and/or S	Top Priority Hazards (hazards, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat wave, etc.)				Priority H M L	Time Short Long Ongoing
				Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire		
ACTIONS - list below									
★ Senior Center V = Basement of T.H. Library	Town Hall	Town	S/V	New Senior Center				H	S
Parkland-recreation		Town	S	Scheduled Maintenance // Ed. public on C.C.				M	O
★ Churches (3)		Private	S	Public outreach/education				M	O
★ Senior Housing MHA / Senior Respts	MA	Town MHA IA	S/V						
★ Senior Housing Stony Bk / Reg Low income + Senior	map	Private		Transportation needs Power Outages					
★ Assisted Living (under Dover Rd. Residences)	map	Private		Emergency Mgt focus on seniors? Education - cooling - T.H./Library heating - Schools, TH				H	S/O
★ 55+ Housing Glen Ellen	map	Private		Communications (no newspaper) Reverse 911					
Schools Hs/Middle School New Elan		Town	S	Landscaping - runoff mgt.				H	S
Schools - Montessori (3) Catholic	7 55	Private		Communications - emergencies Education -				M H	S
Civic Orgs: Lions Garden Club, Millis Forum Amateur League, VFW, Scouts			S	Communication Mobilization				M L	O

yellow

Millis Community Resilience Building
Risk Matrix

www.CommunityResilienceBuilding.org

10.10.10 Liability for action under the Plan or Long term land
Shoring
V = Vulnerability, S = Strength

Top Priority Hazards (tornadoes, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat waves, etc.)

Environmental Features	Location Describe how to reach or reach to (1/2 mile)	Ownership Identify private, public, etc.	V Vulnerability	S Strength	Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire	Priority H/O/L	Time Short term/Long term
ACTIONS - list below										
Wetlands	Town wide	Town + ACE	V	S	Stormwater runoff mgmt. Prevent contamination				H	O
Parks	Town wide	Town	S		444 Parks + open space - how are they maintained - funding??					
Gardens	Town wide	Town Facility	S		Maintenance Dead Trees			444 Gardens??	H	S/O
Tree Canopy	Town wide	Town + Private	S							
Charles River			S		Maintenance - logs/dead trees-flow				L	O
GW Aquifers	Town wide	Town + Private	S		Drought mgmt. Plan (see State)				H	O
Farms (indoor/outdoor)	Townwide	Hydramore Village/ret Apple/Kenel	S							
Boat/canoe launch access to Charles R.			S							
Cedar river - TTR Nature walk spaces 161 Forest Rd	161 Forest Rd	Private TTR	S		Private					
Gypsy Moths / Trees Poisoning	Town		V		Education - plantings, prevention				L	O
DRUGHT Trees falling - dead cuts - 115	Town		V							

Red

Millis Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org					
H.M. Likelihood for action over the short or long term (and ongoing) V = Vulnerability 3 = Strength				Top Priority Hazards (tornado, flood, wildfire, hurricanes, earthquakes, drought, sea level rise, heat waves, etc.)					
Environmental Features	Location Describe how to reach in map & by road	Ownership Identify private, public, etc.	V and/or S	Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire	Priority	Time
								H.M.S.	Short Long Bursting
ACTIONS - list below									
EXISTING WETLANDS			S						
LOCAL WETLANDS RESTORATION			S						
TREE COVER			S						
ARMY CORP OWNED LAND			S/V	-ENHANCE COMMUNICATION W/ ARMY CORPS W/ STATE AND STATE REP.				H	S
WETLANDS - RUNOFF CHEMICAL RISK			V	-PROMOTE BEST PRACTICES PUBLIC INFORMATION				H	S
AQUIFER - DRINKING WATER			S						
AQUIFER CONTAMINATION RISK			V	X SAME					
PUMPING STATIONS DURING/ AFTER EMERGENCY			V	ON INFRASTRUCTURE -HAVE STUDIES EXPENSIVE				H	MED.
FAILING SEPTIC SYSTEMS			V	INSTALL SENSORS					
TOWN LAYOUT - CENTRAL AMENITIES			S/V	GET REVENUE OUT OF LIMITED LAND - STUDY BEST PRACTICES				H	ON GOING
ENVIRONMENTAL LIMITS ON INDUSTRY/USES			V	-ADD SECURITY (FENCE)/INFO -MONITOR				H	S
END POND -SOUTH POND DRINKING WATER RISK			V	REPORT FROM LOCAL AGENCIES -PROVIDE PUBLIC INFO, TREE WATER				H	S
TREES - NEW DISEASE, INSECTS -OAK, MAPLE, ASH, L. PINE			V						

RED TABLE

Millis Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org							
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat wave, etc.)											
H-M-L: Priority for action over the Short or Long term (and Ongoing)								Priority		Time	
V = Vulnerability S = Strength											
Infrastructural Features		Location describe here in words or mark it on map	Ownership identify private, public, etc.	V and/or S	Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire	H-M-L	Short Long Ongoing	
ACTIONS - list below											
FLOODING CAUSEWAY ST.		① CAUSEWAY	PUBLIC	V	ELEVATE ROADWAY				M	LONG	
BEAVER DAMS INCREASE FLOODING		② CAUSEWAY	PUBLIC	V	TOWN PROGRAM TO DISRUPT DAMS/ RELOCATE SEASONALLY				L	LONG	
FLOODING ON RATE 109		③ 109	PUBLIC	V	BRING TO STATE'S ATTENTION				L	LONG	
BRUSHPIRES ON MYRTLE (PUBLIC UTILITIES)		④ MYRTLE	PRIVATE/ PUBLIC UTILITY	V	- WORK W/ UTILITY / LAND MANAGEMENT - FIRE PREVENTION EDUCATION				L	ONGOING	
ELDERLY HOMES W/ NO AIR COND.		⑤	PUBLIC	V	REVIEW CENTER/SITE				H	SHORT	
NO AIR CONDITIONING IN SCHOOLS		⑥	PUBLIC	V	INSTALL AIR CONDITION/ COOLING IN MIDDLE/ HIGH SCHOOLS				H	MED.	
COMMUNICATION W/ ELDERLY (NO INTERNET)		⑦ GENERAL	PRIVATE	V	- PROMOTE NORFOLK SHERIFF'S PHONE PROG. - ADD COMMUNITY ROOMS/ COMPUTER AREAS AT SENIOR HOUSING				M/H	SHORT	
MOSTLY NEW TOWN FACILITIES		GEN.	PUBLIC	S	ENCOURAGE STATE TO CONSIDER CLIMATE CHANGE IN DESIGN ADDRESSING IN CAPITAL PLAN AND DISCUSS W/ STATE - 1 YR BEFORE CLOSING				H	SHORT	
DOVER ROAD BRIDGE OLD - FALLING APART		⑧	PUBLIC	V	SIRE CURRENT DESIGN RELATIVE TO FUTURE WATER PLANS				L	LONG	
CULVERTS NEEDING REPAIR		SEE PPH GEN.	PUBLIC	V	ENHANCE DRAINAGE/ EMERG. CONS/ MAINT. W/ FIELD IMPROVEMENT				L	LONG	
ATHLETIC FIELDS OVERUSED NOT MAINT.		GEN.	PUBLIC	V	ACCOUNT FOR IN CAP. PLAN (5 YR)				M	MED.	
PUMP STATIONS IN HEAVY RAIN		GEN.	PUBLIC	V	PREPARE AND INSTALL				H	SHORT	
RADIO- ADDITIONAL REPEATERS PUBLIC SAFETY			PUBLIC	V	CONTACT UTILITIES DISCUSS CLIMATE MITIGATION				H	SHORT	
NATURAL GAS LINE		⑨		V	INSTALL FIBER CONSIDER UNDERGROUNDING				L	LONG	
MUNI. FACILITIES CUPPER TO VOIP/FIBER		GEN.	PUBLIC	V	ENHANCE PURSUIT OF FUNDING W/ CLIMATE/ EMERG. PREPARE				H	SHORT	
UPDATING TOWN H/ SERVERS		GEN.	PUBLIC	V							
NEW GREEN/ SUSTA/ MODER FACILITIES/ FEATURES		GEN.	PUBLIC	S							
NEW BIOSHALE/ RAIN GARDEN @ SCHOOL		GEN.	PUBLIC	S							
PATROLLING/ RESPONSE OPEN SPACE			PUBLIC	V/S							
ABOVE GROUND UTILITIES/ COMMS				V							

ABOVE GROUND UTILITIES/ COMMS

EQUIPMENT

RED

Millis 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									
Societal Features (people!)	Location describe here in words or mark it on map	Ownership identify private, public, etc.	V and/or S	Top Priority Hazards (hazards, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)				Priority H - M - L	Time Short Long Ongoing
				Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire		
ACTIONS - list below									
SENIOR RECREATION RESOURCES (MORE)			V	STUDY NEED/LOCATION				M	ME
SENIOR CENTER NEEDS IMPROVING			V	STUDY DEDICATED FACILITY				M/H	ME
POPULATION GROWTH & OTHER			V	REVINT ZONING/STORMWATER DISTRICTS/UPDATE FOR GROWTH				M	ME
-LIFE EXPERIENCE SCHOOL. PROMOTE			S						
VERY YOUNG / STUDENTS N/ PLACELIX / MED. VULNERABILITY			V	ENSURE APPROPRIATE BUILDING ENVIRON.				H	SH
SENIORS HOUSING AUTHORITY BUILDING/POPULATION			V	INSTALL AC / PROVIDE DEDICATED RELIEF CENTER - CHECK ON				H	ME
HILLBROOK BRIDGE MANAGER - SENIOR CARE			V	- EVALUATE SECURITY OF BUILDING - CHECK DURING CLIMATE EVENTS				H	ME
ASSISTED LIVING ON DOWEN ROAD			S						
CELL PHONES FOR SENIORS - PROVIDE			V	CONNECT PEOPLE TO NORFOLK COUNTY SHERIFF PROGRAM				H	S
TEENAGE PROGRAMS			V	TEENAGE PROGRAM N/ ENVIRO BENEFIT WORK N/ SCHOOLS STEWARDS				H	S
WIRELESS DIRECT			S						
FEL DAYCARE FACILITIES - YOUNGEST			V	EXPLORE MULTI-GENERATIONAL PROGRAM - SENIOR / YOUNG FAMILY				M	
METRO LEC			S						
TAX BURDEN - DISPLACEMENT/ RESILIENCE FOR SENIORS / FIXED INCOME			V	MS4 / STORMWATER RELATED TAX RELIEF				H	S
EMERGENCY RESPONSE PLANS FOR ALL BUDGS		PUBLIC	S						
VETERANS SERVICES CHALLENGES			V	SEE HILLBROOK				H	S
MENTAL HEALTH DURING EVENTS / CRISES			V	SEE HILLBROOK				H	S
TOWN / EMERGENCY COMMUNICATION			S						

EXPANSE ST.

NORFOLK COUNTY SHERIFF

*

*

*

*

GREEN TABLE

Millis Community Resilience Building Risk Matrix									
www.CommunityResilienceBuilding.org									
Top Priority Records (roads, roads, utilities, structures, infrastructure, design, etc. and any, best score 100)									
(Shoring)									
V = Vulnerability & = Strength									
Infrastructure Features	Location (describe how to reach it, e.g. on map)	Ownership (state, private, public, etc.)	Vulnerability (V) / Strength (S)	Extreme Heat/Heat Waves	Inland and Riverine Flooding	Extreme Cold/Winter Storms/Snow	Drought/Fire	Health (H) / Life (L)	Economic (E) / Social (S)
Town Hall (Shelter)	Gym - emergency gen.	Pub	V	ACTIONS - see below				H	O
Police Station (new)	emergency generator	S	S	* green improvements ongoing maintenance of new systems plan for lobby system upgrades mitigate on-site flooding				H	O
Library (new) LEED	S	S	S	generators - EV charging stations more locations w/ generators solar / micro-grid				H	S
Condensed area of services	Pub	S	S	(solar power)				M	L
New elementary school	S	S	S	(saves 9/19)				M	L
Wells	V	S	S	consider expansion of public H2O supply				M	L
Fire Station (rehabbed)	V	S	S	continue improvements to communication system new equipment				L	S
Senior Center	Floods - basement of Town Hall - fixed	V	S	new senior center (+ location) + better transportation				H	L/O
Private wells & septic	same parts public	S	S	consider expansion of public sewer				M	L
sewage capacity exists	S	S	S	consider expansion of public sewer				M	L
Causing Floods	V	S	S	replace/maintain green infrastructure culverts improvements				M	O
Richardson's Pond	V	S	S	keep I/I work ongoing				M	O
109 can flood near railroad line	V	S	S	same new towers proposed				L	S
spotty cell service in some areas	V	S	S	look to construct urgent care ambulance practice				M	L
no medical center	V	S	S	look to construct urgent care ambulance practice				M	L
advanced life support	S	S	S	assess condition of roads + bridges + implement improvements				H	O
bridge - card unknown (Dorr Rd.)	V	S	S	plan for new school				H	L
High school / Middle School	V	S	S	need to reach seniors (via mail + phone) improved notification system				H	O

Swift reach 9/1)

Green

(read out to Concord - Housing Authority)

www.CommunityResilienceBuilding.org				Top Priority Hazards (seismic, flood, wildfire, hurricanes, earthquakes, drought, sea level rise, heat waves, etc.)				Priority	Time
Societal Features (people!)	Location (describe how it meets or exceeds it)	Ownership (public, private, public, etc.)	Vulnerability (S = Strong, M = Moderate, H = High)	Extreme Heat/Heat Waves	Inland and Riverine Flooding	Extreme Cold/Winter Storms/Snow	Drought/Fire	H-H-I	Short Term Drought
ACTIONS - for below									
Grocery store (gourmet)		Pr	S						
CVS		Pr	S						
Local Emergency		Pr/Pr	S						
Cliffport site			S		moderate for housing & medical services (urgent care)			M	L
Public Housing some upgrades					upgrade facilities				
Transportation for senior citizens			V		(Veterans bus) consider opportunities for expanded service			H	O
Life Experience School			S		look into MATA services/transportation (improved transportation for all)			H	O
Dover Rd. pedestrian - assisted crossing			S						
housing price/availability			V		housing production plan				
Senior population			V		see above &				
Senior housing - services & transp.			V		information sheet				
CDA - air condition - facilitating study for new space		Pr	S						
Nursing Schools			S + V						
5 Same system to read out to retirement pop.									
Long-term care facility			S						
Millis Food Food Pantry (charity)			S						
Active civic groups + churches			S						
no youth center			V		OSRP -				

Green

Millis Community Resilience Building Risk Matrix

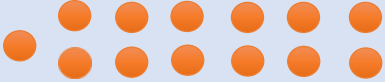











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H-M-L: Priority for action over the Short or Long term (and Ongoing)
 V = Vulnerability S = Strength

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

Environmental Features	Location describe here in words or mark it on map	Ownership identify private, public, etc.	V and/or S	Extreme Heat/ Heat Waves	Inland and Riverine Flooding	Extreme Cold/ Winter Storms/Snow	Drought/Fire	Priority H - M - L	Time Short Long Breath
Tree canopy when flooding			V	tree by law - incentives to replace trees				H	S
lots of open space		Pub/Pr	S						
access to some open spaces needed		Pub/Pr	V						
good overall tree canopy			S						
OSRP underway			S	complete + implement OSRP					
Tree Warden		(Pub. Prop. only)	S						
Tree Farm		Pub	S						
CPA			S						
flood risk throughout town			V	green infrastructure				H	O
Superfund site??				cleaned up already?					
Green Community			S						
no charging stations			V	put in new charging stations				L	S
water quality concerns			V	control off-site, non-point pollution sources				L	O

Appendix D-Top Priority Actions Voting Results

Action	Voting Count
Society	
Create heating and cooling centers with communication and transportation for vulnerable populations, especially seniors.	
Build senior center and youth center together.	
Create youth programs for environmental stewardship and more youth programs for engagement.	
Build a new senior center.	
Build redundancy in emergency communications and IT infrastructure. Seek outside funding.	
Protect students at school from urban heat island and stormwater with innovative design strategies.	
Increase medical facilities, emergency health facilities. Prioritize Cliquot property for site and reduce urban heat island with new development there.	
Connect Seniors to Norfolk County Sheriff's Program for cell phones.	
Launch public education campaign on climate change to seniors.	
Prevent displacement of seniors. Displacement caused by stormwater utility.	
Set up appropriate environment in school system for students with disabilities or special needs.	
Increase/diversify communication strategies to seniors.	
Infrastructure	
Update backup generators at municipal facilities.	
Protect Energy Efficiency of municipal buildings.	
Repair Dover Road and Route 109 bridges to preserve emergency access. Consider climate projections in design.	

Reduce Stormwater Inflow, manage stormwater runoff, and modify building regulation and education. Manage well contamination from stormwater runoff with private well inspections.



Implement culvert upgrades and repair plan.



Increase access to emergency facilities with new facilities and/or transportation.



Expand sewer capacity.



Higher rates for outdoor watering.

Environment

Balance nature-based resilience solutions with economic growth to ensure Millis remains a vibrant community in the face of climate change.



Prevent wetland contamination with stormwater management.



Enhance Communication with Army Corps of Engineers in cooperation with State on Charles River Natural Valley Storage Areas.



Public education program on water resources and use-reduction of chemicals and toxics.



Encourage smart growth development



Maintain natural assets and trees, especially from disease.



Create a tree bylaw to manage and protect trees on private property.



Complete a drought management plan.

Launch a public education campaign on minimizing exposure to vector-borne diseases.