TOWN OF PALMER

March 15, 2019

Municipal Vulnerability Preparedness

Community Resiliency Building Workshop

SUMMARY OF FINDINGS

Catalyst for Regional Progress

PVPC

Prepared and Presented by

Pioneer Valley Planning Commission
and
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This project and the following report was made possible through funding from the Massachusetts Executive Office of Energy and Environmental Affairs' Municipal Vulnerability Preparedness (MVP) Grant Program.

Cover image courtesy of Angela Panaccione

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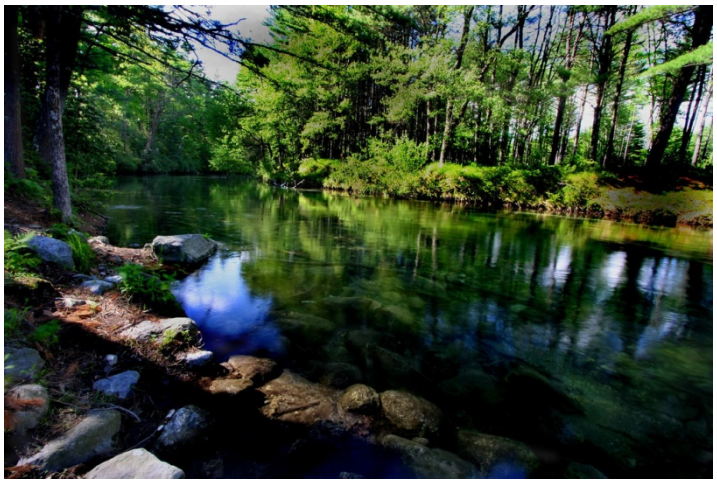
OVERVIEW

Located at the confluence of three rivers and the headwaters of a fourth, the Pioneer Valley Town of Palmer has experienced firsthand the urgent need to take municipal action to increase resilience to extreme weather and natural hazards. Municipal officials are responding to recent weather-related events, such as Hurricane Irene and its related flooding in August 2011, the unusually early snow storm of October 2011 that caused extended power outages, the 2016 drought that threatened drinking water supplies, and the extreme cold spells in the winter of 2017-2018 that endangered elders living on fixed incomes, by proactively planning to mitigate and manage the severe risks associated with these natural hazards. Using the most up to date scientific data available from the State, and led by Palmer's own Town Department heads and volunteer boards and commissions, Palmer's priority climate change adaptation actions will reduce the exposure and vulnerability of its citizens, infrastructure, and ecosystems. This commendable work also contributes to the greater climate resilience of the entire Pioneer Valley region and the Commonwealth of Massachusetts.



The Swift River is one of four rivers that flow through Palmer.
Source: Angela Panaccione

Recognizing the importance of both mitigation and adaptation strategies to deal with the challenges of climate change, the Town of Palmer used the Municipal Vulnerability Preparedness (MVP) Planning grant as an opportunity to build on existing programs with these same goals. The Town is a certified Green Community, and has passed zoning amendments to facilitate natural resource protection which enables nature to do its job to protect the Town, such as letting flood water flow into flood plains where development is prohibited. Transfer of Development Rights and Open Space Residential Development ordinances are two of the tools included in the Town's Resilience Tool box. In 2018, the Town formed a planning team comprising the Town Manager, Conservation Agent, Town Planner, Planning Board Chair, Department of Public Works Director, Police Chiefs, Fire Chiefs, and members of the Conservation Commission, which pursued and was awarded funding from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to advance a Community Resilience Building (CRB) workshop under the MVP program.

The core directive of the MVP program is to engage community stakeholders to facilitate the education, planning, and ultimate implementation of priority climate change adaptation actions. Completion of the MVP process will enable the Town to achieve MVP certified community status from EOEEA by June of 2019 and receive preference for future state grants.

This report provides an overview of the top hazards, current concerns and challenges, strengths, and proposed actions to improve the Town of Palmer's resilience to natural and climate-related hazards as identified at the CRB workshop. The summary of findings provided in this report is supported by more detailed analyses in the Town's 2016 Natural Hazard Mitigation Plan.

COMMUNITY RESILIENCE BUILDING WORKSHOP

The Town of Palmer employed the Community Resilience Building framework, a unique "anywhere at any scale" community-driven process, to host an eight-hour workshop on February 1, 2019. The list of workshop invitees and workshop content was guided by input from the core MVP planning team, and included Town elected officials, community members, and consultants from the Pioneer Valley Planning Commission. The workshop's central objectives were to:

- Affirm community consensus of the local meaning of extreme weather and local natural and climate-related hazards;
- Identify existing and future vulnerabilities and strengths;
- Develop and prioritize actions for the Town and a broad stakeholder network;
- Identify opportunities for the community to advance actions to reduce risk and increase resilience.

Conservation Agent Angela Panaccione introduces the MVP workshop.
Source: PVPC

Thirty-four participants from town boards and committees, land holding conservation agencies, community organizations, local businesses, and other interest groups attended the workshop, which included a combination of large group presentations and small group activities. Pioneer Valley Planning Commission staff began the day with a presentation outlining the workshop process and goals, updating participants on past and ongoing local planning efforts, and presenting new state-provided climate projection data to provide both decision-support and risk visualization. Participants then broke out into four small groups and assumed different participatory roles and responsibilities to engage in a rich dialogue, sharing ideas and experiences.

TOP HAZARDS & VULNERABLE AREAS

Leading up to the workshop, PVPC worked with input from the Town MVP planning team to identify the top four natural hazards for the Town of Palmer. These hazards were selected based on findings from previous planning processes, stakeholder input, and new climate change projections. Severe winter weather with snow, ice, and wind was identified as a hazard of great concern by most team members, as was severe storms with strong winds such as hurricanes or tropical storms. Stormwater, riverine, and/or culvert flooding was selected as another top concern, as were extreme temperatures. During the CRB workshop, participants had an opportunity to approve these selections as the hazards that have the greatest impacts on Palmer's operations and natural resources, and on residents' safety and wellbeing.

TOP HAZARDS

- Severe winter weather, including snow, ice, blizzard, and wind
- Hurricanes/Tropical Storms
- Flooding (riverine, stormwater, and/or culvert-based)
- Extreme temperatures

AREAS OF CONCERN

Infrastructure: Pole-based electricity and communication lines, culverts, bridges, dams, sewer system, private wells, the reservoir and public wellfields, stormwater system, the DPW building located in the flood plain, and decentralized fire and water districts

Natural Resources: The four rivers and their buffer zones, wetlands and water bodies, large amount of forest cover, invasive species, cold water fisheries and fish hatcheries, water supply protection

Human and Social: School building and building systems in poor repair, high prevalence of vulnerable populations (including elderly, low income, disabled or handicapped), low income and senior housing communities, the Council on Aging building, Town-Public communication systems

CURRENT CONCERNS & CHALLENGES BY HAZARD

The Town of Palmer faces multiple challenges related to the impacts of climate change and natural hazard-related weather events and Town officials are aware of the increasingly unpredictable nature of these events as well as their growing frequency. It is this awareness that is motivating the Town to build community resilience. Municipal officials are determined to learn from past disruptive and dangerous weather events, including the unusually early October snow storm of 2011 that caused extended power outages because the leaves were still on the trees so the weight of the snow broke branches onto power lines and the arctic cold weather in the winter of 2017/2018. Located at the confluence of three rivers and the headwaters of a fourth, the Town also sustained heavy flooding impacts during the rains of Hurricane Irene.

Impacts from storms with high winds and/or accumulation from freezing precipitation are exacerbated by increasingly weakened forest and tree health due to influxes of harmful pests in local forests. Unhealthy trees and their limbs are more likely to be brought down by the weight of snow, ice, or water and under the force of wind, increasing the risks of prolonged power outages and hazards to residents' health and property, and to public and private infrastructure. The magnitude and intensity of these events over the course of just a few years has increased awareness of natural hazards along with climate change and motivated communities like Palmer to comprehensively improve resilience at the individual and municipal level.

Palmer's MVP workshop participants agree that the Town and region are experiencing more intense and frequent storm events, the impacts of which affect the daily activities of all residents. There was also a common concern about the challenges of being prepared for future severe weather events, including the ability to shelter residents close to home; the resilience of the transportation network—especially evacuation routes—to changing weather and temperature fluctuations, and the need for the road network to remain operational for emergency travel, at a minimum; and the desire to ensure that the town's most vulnerable residents can access the existing resources they would need in event of emergency. Furthermore, participants established a common directive to improve the efficiency and efficacy of communication systems throughout town, both in times of emergency and in day-to-day operations.

Frequent and heavy rain events in January 2019 caused stormwater flooding of roadways throughout town. Source: Angela Panaccione

SPECIFIC CATEGORIES OF CONCERNS & CHALLENGES

TRANSPORTATION INFRASTRUCTURE

Palmer's four villages are connected along two main routes – Route 181, traveling north-south through Town, and Main Street, traveling east-west. Palmer also has direct access to the Massachusetts Turnpike (Interstate 90) at Exit 8. These three routes are all primary evacuation routes. Other main evacuation routes include State Routes 67, 20, and 32. Routes 181, 67, and 20 are all locally known to be prone to

flooding, with Route 20 having a particularly notable history of flooding along Park Street, from the intersection with Breckenrick and Pinney Street and at the railroad overpass by 181 Intersection. Another concern voiced at the workshop regarding road passability is that of bridges being in poor repair. All of the bridges in Palmer are over 25 feet in length and therefore ineligible for MassDOT's Small Bridge Grant Program.

Palmer was once known as the "Town of Seven Railroads," and today, there are three active rail lines remaining within the town. The remaining lines, controlled by Mass Central, CSX, and the Boston & New England, and Maine (PanAm Railways) companies, are used predominately for commercial shipping, but still transport some passenger rail. Workshop participants noted that communication between Palmer and the rail companies is challenging, and that the Town is often unable to get a response from the rail companies in a timely manner. The railways are of specific concern due to the transportation of hazardous materials, which, if spilled, could affect the safety of Palmer residents and the environment. Further, the railroad companies own the culverts underneath the lines, so when repair or replacement is needed, the Town has no recourse to pursue action. Finally, the Town has previously experienced a passenger rail emergency during the October 2011 ice storm, when Amtrak suspended service on several Northeast routes and one train from Chicago to Boston was stranded overnight in Palmer. While these travelers were kept warm and fed in their train cars until buses arrived to carry them to their final destinations, future situations could demand action on behalf of Palmer's emergency management team.

RIVERINE & STORMWATER FLOODING

Most of the town's resident population is concentrated in Palmer's four villages: Three Rivers, Thorndike, Bondsville and Depot Village (aka Palmer Center). Because of village locations in and near floodplains, Palmer's four population concentrations are particularly vulnerable to floods. According to the FEMA Community Information System (CIS), there are 32 structures located within the Special Flood Hazard Area (SFHA) in Palmer. Workshop participants brought up the damage inflicted by repeated riverine flooding on the DPW building, which is located in the floodplain of the Quaboag River. There are several businesses located in the vicinity that experience flooding as well. Finally, participants noted that there are drinking water wells located along the Quaboag River floodplain, which they believe to be affected by contact with contaminated floodwaters.

Each small group identified stormwater and/or culvert flooding as posing significant problems to the town. As with towns across the region, many of Palmer's culverts are clogged with sediment and debris, in addition to being undersized for current and future rainfall patterns. Undersized or blocked culverts cause roadway flooding and erosion, damaging pavement, preventing passability, and straining maintenance budgets.

Electrical Distribution System and Back up Power

Electricity is one of the most critical pieces of infrastructure in modern societies, and electrical service outages in town can be caused by, or impact the effects of, any of the hazards prioritized during the Palmer MVP process. In 2011, a record early snow storm downed tree limbs and electrical wires, blocking roads and leaving some residents without power for days and helping the community to assure back-up power generators at all key public buildings. There was broad consensus during the workshop that the community is at risk as long as the electrical distribution system is highly vulnerable to prolonged interruptions from storm events. Residents who rely on electrical power for medical- or life-support, are particularly vulnerable to the secondary impacts of a power outage, including prolonged exposure to extreme cold or heat.

Communication Networks

Palmer currently subscribes to a reverse 911 system that can distribute information to any residents who sign up for alerts. The system, however, can only help those residents who know about it and sign up. The town has found resident participation to be lacking and also feels as though the program does not offer sufficient options for customization.

In addition to updating the reverse 911 system, workshop attendees noted a need to improve computer literacy among residents in order to more effectively communicate via the Town's social media and website. Approximately 20% of Palmer households are without a computer at home.[1] Several work groups suggested that the town library could be a natural partner for this type of strategy.

Vulnerable Populations

Approximately 18% of Palmer's population is over 65 years of age[2], and may be more difficult to reach in the event of an emergency due to lack of mobility, physical or mental impairments, and/or social isolation. Seniors are generally more vulnerable to the effects of extreme temperatures, and therefore to secondary effects such as power outages, which prevent the use of air conditioning or heating. Additionally, workshop attendees noted that the senior center lacked adequate parking facilities to accommodate program participants, and that the building's infrastructure was aging and in need of updates.

Palmer has very high percentages of people with disabilities (20%), with over 3 times the national rate of young people with disabilities (12.7%), a higher percentage (15.1%) of adults aged 18-64 with disabilities than national (10.1%) or state (8.8%) averages, and much higher rate of seniors with disabilities (52%),

[1] US Census Bureau, https://www.census.gov/quickfacts/palmertowncitymassachusetts
[2] Ibid.

compared to state (33.7%) and national (36.5%) rates.[3] Residents with disabilities may face serious obstacles in mobilizing and/or evacuating in the event of an emergency.

Just over 14% of Palmer residents are living in poverty.[4] These community members may lack the financial capacity to evacuate in an emergency, afford air conditioning units or increased heat costs, or keep up with day-to-day costs of living when weather disrupts the local economy.

Emergency Operations

The Town has seven emergency shelters, four of which are outfitted with backup generators (Converse Middle, Old Mill Pond, Palmer High, and Pathfinder Regional Vocational Technical High schools). Other Town-owned buildings with backup power include the three village fire stations; the Town Administration Building with generators to power the Police Station and Emergency Operations Center; the Department of Public Works; and the wastewater treatment plant (WWTP).

Wastewater and Drinking Water Resources

Palmer's sewer system services 50% of the residences within the town. The remainder of the Town relies on private septic systems.

Palmer's public drinking water is supplied by four private water districts – Palmer, Three Rivers, Bondsville, and Thorndike – which serve approximately 50% of the town's potential customers within the four villages. The water districts rely on both groundwater and reservoir surface supply to serve their customers. The water lines were mainly established to service the older mill housing and have not been expanded to cover much more than the centers of the villages over the years. The remainder of the Town relies on private wells.

The majority of Palmer's soils are glacial till and glacial outwash soils, allowing for rapid infiltration. While these soils enable good groundwater recharge, they do not provide much filtering action, leaving groundwater susceptible to contamination. In an analysis of Palmer's Water District Supplies as part of its Source Water Assessment and Protection (SWAP) report, MassDEP deemed these sources to be highly susceptible to contamination based on nearby land uses.

Workshop participants noted a need to review existing regulations around the aquifer protection zone to ensure adequate protection and to work with land trusts and private land owners to permanently protect key parcels around recharge areas. There were two other items of note related to drinking water: promoting better communication between the Town and water districts, and a better system for the Board of Health to collect and manage private well testing information.

[3] Hampden County Twelve Town Community Health Needs Assessment, 2015
[4] US Census Bureau, https://www.census.gov/quickfacts/palmertowncitymassachusetts

NATURAL RESOURCES

Due to the abundance of rivers, wildlife management areas, trails, and other natural areas in town, Palmer is an outdoor recreation destination. The town's waterways support a cold water fishery-Kings Brook, the MassWildlife Roger Reed Hatchery, and Natural Heritage and Endangered Species Program (NHESP) endangered species and species of special concern.

Workshop participants noted the need to do more to protect the town's natural resources. While the majority (68%) of Palmer's land area is undeveloped forestland, only 11.5% of the forested area is permanently protected. As noted in the previous table, protecting forested and undeveloped area is of local concern to maintain drinking water quality. Additionally, MVP participants would like to see greater riverfront buffers to protect against riverine flooding and promote healthy surface water quality. Lastly, participants identified the need to promote sound forest management against invasive species as the area has seen recent influxes of gypsy moth population.

DAMS

Based on DCR sources and local knowledge, there are 15 dams in Palmer. Five of these dams have been identified by the Massachusetts Office of Dam Safety (ODS) as being of "significant hazard," indicating that failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities. Workshop participants were not sure if the dams of significant hazard had emergency action plans (EAP) in place. ODS requires owners of significant hazard dams to develop EAPs, but these plans are not always shared with local emergency management officials.

CURRENT STRENGTHS & ASSETS

As a result of Palmer's broad experience with extreme weather and the impacts of climate change, workshop participants were quick to point out their communities' strengths in responding to the challenges identified above. Reinforcing and expanding upon these strengths and community assets is a common theme of the proposed actions presented later in this report to increase resiliency against the impacts of climate change.

Some of the key strengths discussed included:

- The town's abundant conservation lands, trails, and waterbodies that foster a local recreational economy which draws outdoor enthusiasts from around the region.
- Palmer's commitment to reducing municipal energy use as demonstrated by the Town's early certification as a Green Community (2010) and the Town's successful implementation of their

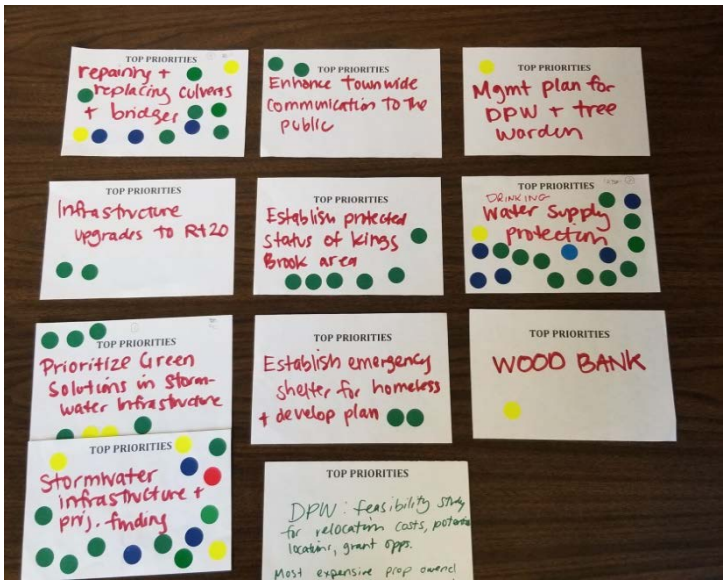
Energy Reduction plan has guaranteed ongoing eligibility for grant funds to make improvements and upgrades to the Town's assets.

- The Baystate Wing Hospital, located in Depot Village, provides healthcare, community benefits, and jobs to residents.
- The Swift River Greenbelt, managed for the preservation of the Swift River's flood plains, wetlands, and wildlife habitat, is seen as a highly successful conservation project. The property was recently funded for an accessible trail.
- A microgrid feasibility study is being conducted by Thorndike Energy for the Town of Palmer, leveraging its existing solar and hydropower assets. The proposed project will support emergency response providers as well as critical facilities, including the Wing Hospital, Big Y, and a school which could serve as an emergency shelter.
- Despite the previously described hazards presented by the town's railroads, they were also identified as a strength—burgeoning the local economy and providing a link to Palmer's storied past as the Town of Seven Railroads.

The Town of Palmer strongly identifies with its ties to passenger and freight rail.
Source: The Town of Palmer from Wing Hospital

TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

Workshop participants identified more than 65 actions that the Town of Palmer, in collaboration with neighboring municipalities, regional partners and state agencies, should take to improve resilience to the impacts of climate change. Toward the end of the workshop, each small group presented its three top priority actions to the large group. These actions were grouped with like actions from other small groups, and then voted on by the large group.



Workshop participants voted with colored dots on their top priorities.
Source: PVPC

The following top priority recommendations were developed at the four small group tables, and are presented here in no specific order:

- Conduct a town-wide inventory of roadways, culverts, bridges, and other transportation and stormwater infrastructure to assess condition, identify vulnerable infrastructure in need of maintenance, repair, or replacement, and prioritize projects for investment.
- Improve communication to the public.
- Conduct a feasibility study for relocating the DPW out of the floodplain; include analysis of costs, potential locations, and grant opportunities.
- Prioritize and implement infrastructure repairs and upgrades to Route 20 to alleviate impacts from flooding.
- Establish protected status of King's Brook Area.
- DPW and Tree Warden should develop and implement a tree management plan.
- Identify strategies and move forward with drinking water supply protection.
- Establish a wood bank for use by low-income residents, supplied by timber from Town-owned downed trees and tree limbs.
- Establish emergency shelter for the homeless and develop an emergency plan.
- Develop a stormwater infrastructure management plan, identify project funding, and prioritize nature-based solutions in future stormwater projects.

The entire suite of recommendations was sorted into the following categories:

- Communications/Social Resilience
- Energy Distribution System / Energy Efficiency

- Transportation
- Drinking Water/Wastewater/Stormwater Management
- Open Space and Land Management
- Emergency Management

An overview of the MVP process in Palmer including all the recommended MVP actions was shared with the public at a public listening session on April 8, 2019. Materials from the Public Listening Session are provided in Appendix E.

A full list of the final recommendations, organized by high, medium, and low priority within the above categories is provided below. Note that some actions span categories, and have been located within the category considered the most suitable at the time of this writing.

HIGH PRIORITY ACTIONS

CATEGORY	ACTION
COMMUNICATIONS / SOCIAL RESILIENCE	Develop protocol for communication between Town and residences in event of emergency, and ensure residences have emergency action plans, including transportation options if residences need to evacuate, etc.
	Identify and develop transportation options and support for vulnerable residents, including communication strategies, and resource supplies (food, water, necessities) in case of disruptions in transportation, mail, and/or federal assistance programs, such as WIC and SNAP.
	Build relationship/coordinate between Palmer Healthcare and town emergency managers. Verify facility is included in emergency plans/evacuation plans.
EMERGENCY MANAGEMENT	Conduct feasibility study to identify possible relocation of DPW and Animal Control Facility out of flood plain; identify associated costs and possible grant funding.
	Identify grant funding and establish protocol for expanding hours of operation for heating and cooling centers (CoA and Library, both of which are only open during normal operating hours).
	Identify funding for full backup generators for heating and cooling centers and the Town shelters which may not have it.
	Develop protocol for housing residents with medical needs (oxygen, etc.) in shelters and train staff, instead of sending them to Baystate Wing, which is not a shelter.
	Conduct an air quality assessment and building assessment of school buildings to determine suitability for emergency shelter.
	Town (and those in immediate fall-out zone) should familiarize themselves with railroad's emergency response plans should hazardous materials spill or become compromised.
	Maintain strong communication between the three fire districts; improve education and awareness of existing resources and emergency preparedness.
	Ensure four water districts maintain and follow coordinated response plans to hazards.
	Ensure proper communications systems are in place for non-Town owned shelters, such as churches.
	Communicate with Palmer Water District about Emergency Action Plan and dam condition for Graves Brook Dam.
	Update Town Master Plan and stormwater code to require stormwater analysis with current data like Atlas 14 or Cornell rainfall data.

ENERGY DISTRIBUTION SYSTEM / ENERGY EFFICIENCY	*No high priority actions identified.*
TRANSPORTATION	ID funding for bridge repair, as all bridges in Palmer are >25' and therefore ineligible for DEP's Small Bridge Grant Program.
	Conduct a culvert assessment and prioritization plan and replace priority undersized culverts.
	Find a way to increase communication with CSX Railroad, which owns undersized culverts under Route 20.
	Work with MassDOT to redefine evacuation routes, given flooding concerns over multiple state routes.
	Cooperate with rail owners and increase communications, including identifying a point person within each company; ensure stormwater compliance regarding railroad culverts and projects
DRINKING WATER / WASTEWATER / STORMWATER MANAGEMENT	Study feasibility of stormwater utility/enterprise fund to fund MS4 permit requirements; recalculate Palmer's impervious surface and update MassGIS datalayer.
	Update stormwater management ordinance to comply with 2016 federal MA MS4 permit.
	Continue to map MS4 system and identify and streamline local interjurisdictional permitting issues.
	Conduct feasibility study to evaluate uniting the town's 4 water supply districts.
	Pursue DEP drinking water supply protection grant.
	Conduct an engineering study of the Ocean State detention basin to determine functionality. (Angela? Correct desc?)
	Investigate incentives/grants/motivation (state provided assessments, tax incentives, financing, etc.) for private owners to develop Stormwater Management Plans for existing their buildings.
	Create an alternative plan for Baystate Wing water supply, if town supply is compromised (both drinking and non-drinking water); explore separation of potable/non-potable water.
	Explore options of joining a mosquito control district, and require stormwater facility reporting to ensure proper drainage.

OPEN SPACE AND LAND MANAGEMENT	Work with FEMA to reclassify riverine flooded area on Route 20 as within an updated 100 year flood zone.
	Develop beaver management strategies to reduce flooding concerns.
	Identify key parcels to preserve for drinking water protection and work with land trusts to acquire properties.
	Apply for water management/conservation program grant under EEA.
	Identify and study eradication methods for gypsy moth and other tree pests.
	Hire a qualified tree warden.
	Develop a five-year management plan for vegetation in rights-of-way and town land, including a street tree inventory and management plan.
	Identify possible stream restoration projects, buffer enhancement and funding sources.
	Explore feasibility of revising the Town's Riverfront Area (RFA) from 25' to 200', and/or provide education regarding land and development practices within RFA.
	Remove point source discharges into the town's waterbodies.
	Work with State to promote control of ticks.
	Identify grants to clean up and respond to increased vegetation growth in Forest Lake, which is experiencing increased temperatures; identify and implement stormwater improvement to improve water quality going into lake.

MEDIUM PRIORITY ACTIONS

CATEGORY	ACTION
COMMUNICATIONS / SOCIAL RESILIENCE	Improve access to computers and computer literacy, possibly by partnering with Palmer Public Library.
	Identify ways to make contacting the Town and Town officials/staff easier via website, such as a contact form.
	Conduct a feasibility /cost study of moving Senior Center operations or expanding parking to adjacent lots.
	Continue to advertise brown bag grocery and congregate meal programs, transportation to local grocers and social outings.
	Maintain an up-to-date list of homebound seniors.
	Investigate options to change zoning to prohibit mobile homes in flood vulnerable areas; explore options for relocating.
	Work with the Senior Center to identify concentrated locations of most vulnerable populations and nearby emergency centers. Then ensure that have good signing for evacuation routes with an emergency center destination.
	Conduct feasibility study of elevating or improving buildings on Water Street, which are in the floodplain of the Quaboag River.
EMERGENCY MANAGEMENT	Identify if there are up-to-date Emergency Action Plans (EAPs) for dams of significant hazard and increase communications with dam owners.
	Model data to ensure that the Three Rivers flood control system is capable of handling expected increases in precipitation intensity.
	Inventory existing available shelters and the resources available at each (showers, pets accepted, food, etc.).
ENERGY DISTRIBUTION SYSTEM / ENERGY EFFICIENCY	Conduct regulatory review to identify opportunities to ensure protection of natural resources when siting solar projects, and finish revising large scale solar ordinance
	Conduct regulatory review to identify opportunities to encourage or require burying new electric lines in subdivision/new developments.
	Conduct a feasibility study of burying existing utility lines, especially vulnerable electric lines.
	Identify funding opportunities to upgrade school buildings & systems, including heating/cooling/HVAC,

CATEGORY	ACTION
	leaking and flooding concerns, and mold issues.
	Develop an educational program targeted to specific sectors to educate on how and why to reduce energy consumption in daily operations, with emphasis on specific impacts in Palmer.
TRANSPORTATION	*No medium priority actions identified.*
DRINKING WATER / WASTEWATER / STORMWATER MANAGEMENT	Conduct a public education campaign to encourage residents and business owners to keep their local catch basins clear.
OPEN SPACE AND LAND MANAGEMENT	Continue to acquire and permanently protect forested land around rivers and streams to protect water quality and secure funding for continuing land protection.
	Develop a forest management plan for town-owned properties, including for possible revenue generation.
	Conduct a regulatory review of the aquifer protection zone regulations to ensure adequate control of land use over aquifer recharge areas.
	Conduct feasibility study to determine ways to address grandfathered uses when property changes hands on Water Street, in the floodplain of the Quaboag River.

LOW PRIORITY ACTIONS

CATEGORY	ACTION
COMMUNICATIONS / SOCIAL RESILIENCE	*No low priority actions identified.*
EMERGENCY MANAGEMENT	Address flooding vulnerability of site access to MEMA staging area (currently K-mart), and formalize use of area.
	Identify funding opportunities to maintain the Three Rivers Flood Control facilities.
ENERGY DISTRIBUTION SYSTEM / ENERGY EFFICIENCY	Continue to explore micro-grid project and advance as feasible.
TRANSPORTATION	*No low priority actions identified.*
DRINKING WATER / WASTEWATER / STORMWATER MANAGEMENT	Explore how changing weather patterns will impact water supply/quality.
	Enhance data collection from private drinking water wells, to monitor groundwater data. Board of Health to organize data and the reports it is getting to understand where the major issues may be and then communicate with well owners. This could include the water districts.
OPEN SPACE AND LAND MANAGEMENT	Work with hatcheries to reduce effluent pollution in waterbodies.
	Protect existing undeveloped riverfront and identify a vision for future greenways (flood zones, purchasing sites, etc.).

ACTION IMPLEMENTATION DESIGN

Once participants voted on the top priority actions, each team was asked to select one action and begin to develop an implementation plan. For each action, the small groups filled out an Action Implementation Design worksheet, providing information on the lead agency/ department for implementation, the partners that would need to be involved for successful project completion, an estimated cost for the project, known or potential funding sources, and implementation milestones. This exercise was a tool for Palmer decision makers to get a head start on the thought process that would be required to apply for a MVP Action Grant, a funding opportunity from EOEEA eligible for MVP Certified Communities. The completed Action Implementation Design worksheets are provided in Appendix C.

Workshop participants after the conclusion of the full day workshop.
Source: PVPC

WORKSHOP PARTICIPANTS

Thirty-four participants from Town departments, committees and boards, large land owners, community organizations, and businesses were in attendance at the MVP workshop.

PARTICIPANT NAME	DEPARTMENT/COMMITTEE AFFILIATION, POSITION
Charlie Blanchard	Town Manager
Angela Panaccione	Conservation Agent
Lorinda Baker	Town Council
Gerry Skowronek	DPW Director
Stephen Muniec	Palmer Public Schools
Joseph Sawicki	Highway
Kenny Lord	WWTP
John Janulewicz	Police Chief
Alan J. Roy	Fire Chief: Palmer

Scott Turner	Fire Chief: Three Rivers
John Daniels	Fire Chief: Bondsville
Linda Leduc	Planning/Economic Development
Michael Marciniec	Planning Board Chair
Donald Blais Jr.	Conservation Commission Chair
David Cotter	Conservation Commission V. Chair
Peter Izyk	Conservation Commission
Nick Zeo	Conservation Commission
Branda Cole	Conservation Commission
Dorothy Lawrence	Conservation Commission
Bonnie Weeks	Building Inspector/Zoning EO
Joshua Mathieu	Dept of Health
Marlene Johnson	Council on Aging
Jeff Stanhope	Tree Warden
Kelly Sitek	Wing Hospital EMC
Ed Hood	Opacum Land Trust
Howard Fife	PLMC/Opacum Land Trust
Keith Davies	Chicopee 4 Rivers Watershed
Sheila Cuddy	Quaboag Valley CDC
Don Frydryk	Sherman & Frydryk
Nancy Bisnette	Quaboag Valley Coop
Michelle Corbeil-Crawford	PHS Environmental Science Teacher
Sarah Brodeur	Palmer Land Management Committee (PLMC)
George Nolan	Baystate Wing Hospital
Dorothy Lawrence	Conservation Commission

CITATION

Palmer (2019) Community Resilience Building Workshop Summary of Findings. Pioneer Valley Planning Commission. Palmer, Massachusetts.

MVP WORKING GROUP

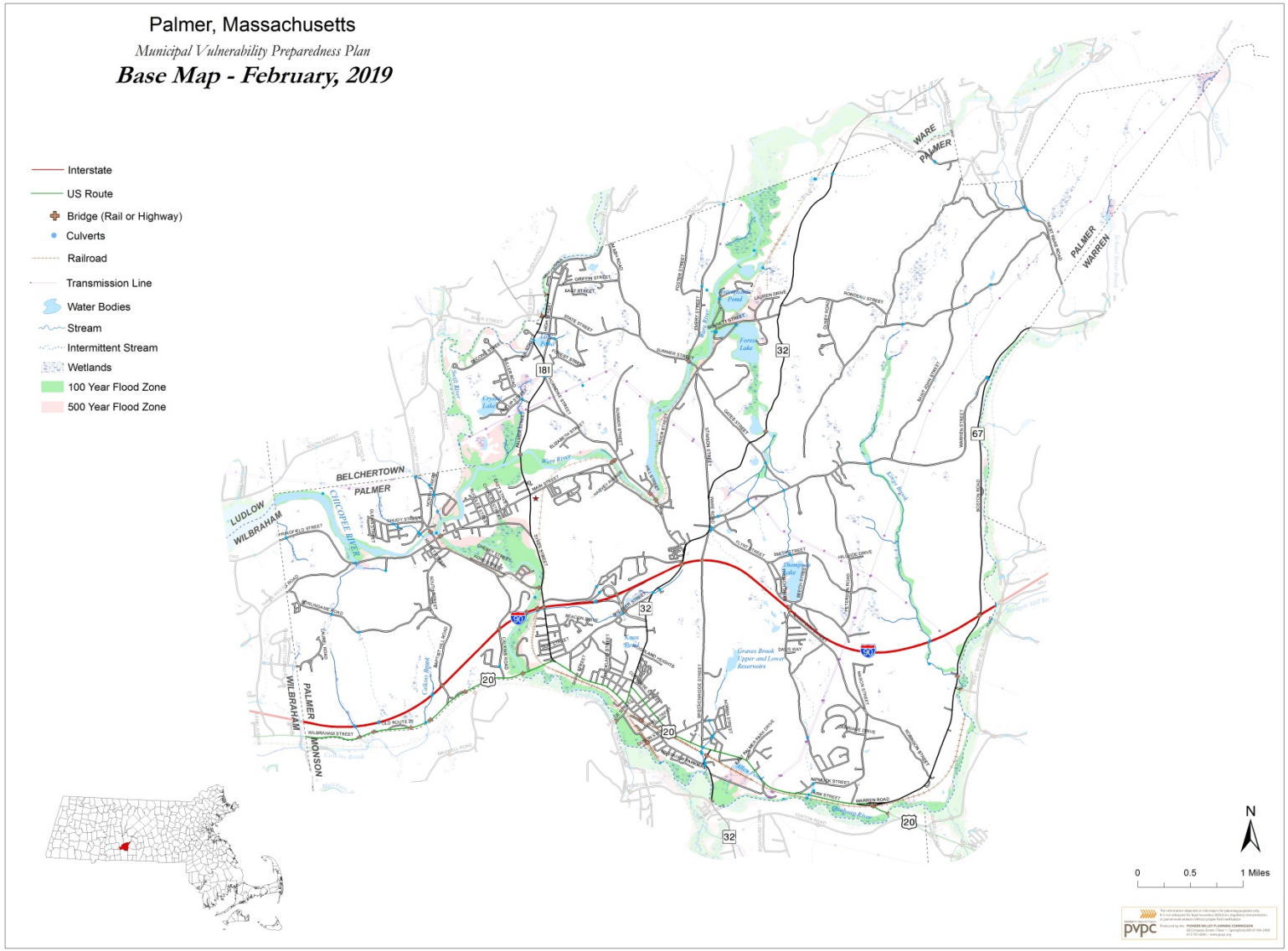
- Charlie Blanchard, Palmer Town Manager
- Angela Panaccione, Palmer Conservation Agent
- Gerry Skowronek, Palmer DPW Director
- Mike Marciniec, Chair, Planning Board
- Linda Leduc, Town Planner & Economic Development Director
- John Janulewicz, Police Chief
- Alan J. Roy, Fire Chief-Palmer
- Scott Turner, Fire Chief-Three Rivers

- John Daniels, Fire Chief-Bondsville
- David Cotter, Conservation Commission V Chair
- Donald Blais, Jr. Conservation Commission Chair

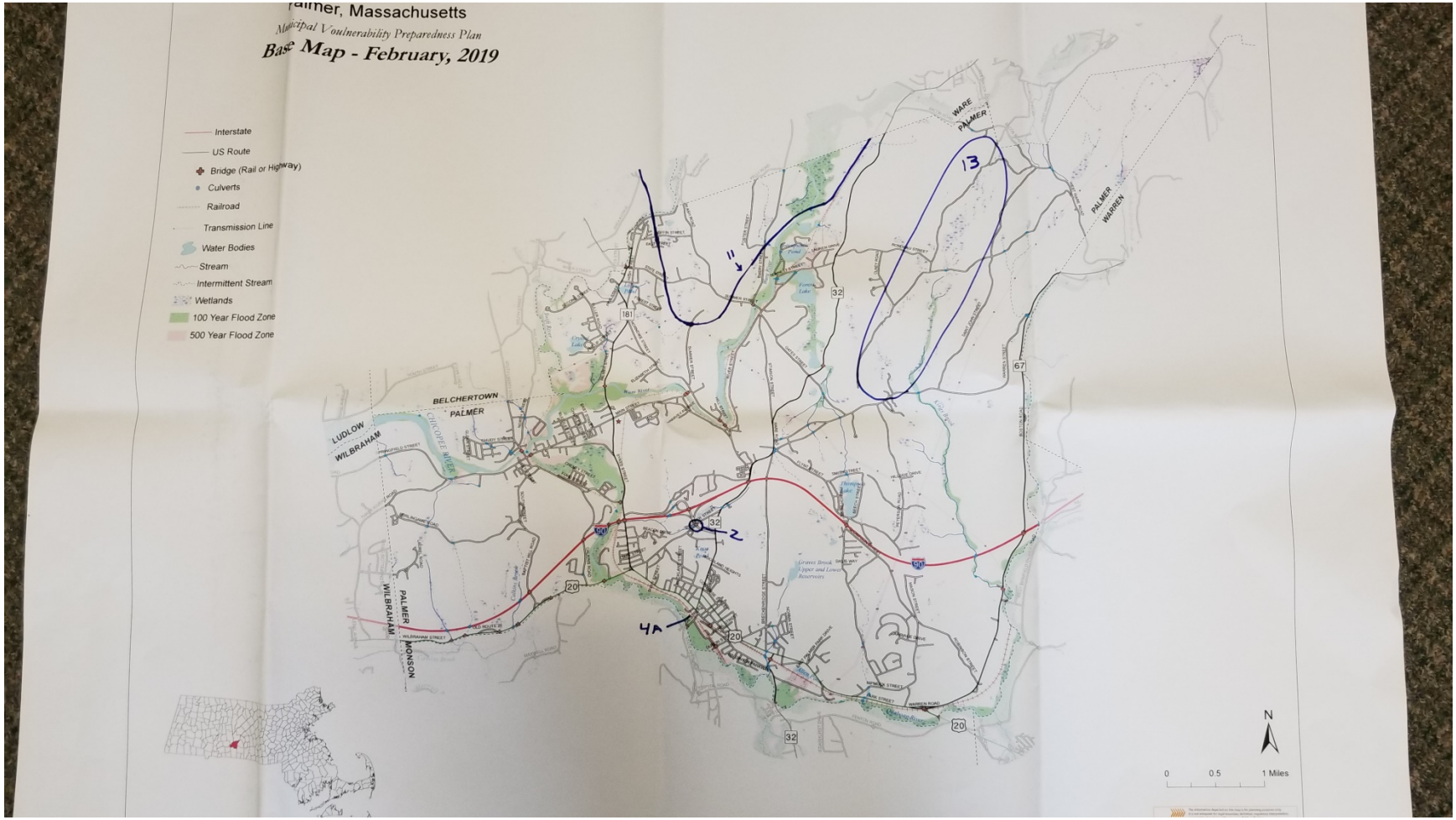
ACKNOWLEDGEMENTS

Special thanks to the Town of Palmer Police Department and staff for their willingness to enhance this process and provide the facilities to convene. This project was made possible through funding from the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness program.

APPENDIX A: WORKSHOP BASE MAP



APPENDIX B: PARTICIPATORY MAPPING RESULTS


Palmer, Massachusetts
Municipal Voulnerability Preparedness Plan
Base Map - February, 2019
Interstate
US Route
Bridge (Rail or Highway)
Culverts
Railroad
Transmission Line
Water Bodies
Stream
Intermittent Stream
Wetlands
100 Year Flood Zone
500 Year Flood Zone
WARE
PALMER
PALMER
WARREN
BELCHERTOWN
PALMER
LUDLOW
WILBRAHAM
CHICOPEE RIVER
PALMER
WILBRAHAM
MONSON
13
11
2
4A
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0.5
1 Miles


Palmer, Massachusetts
Municipal Voulnerability Preparedness Plan
Base Map - February, 2019
Interstate
US Route
Bridge (Rail or Highway)
Culverts
Railroad
Transmission Line
Water Bodies
Stream
Intermittent Stream
Wetlands
100 Year Flood Zone
500 Year Flood Zone
BELCHERTOWN
PALMER
LUDLOW
WILBRAHAM
MONSON
WARE
PALMER
WARREN
N
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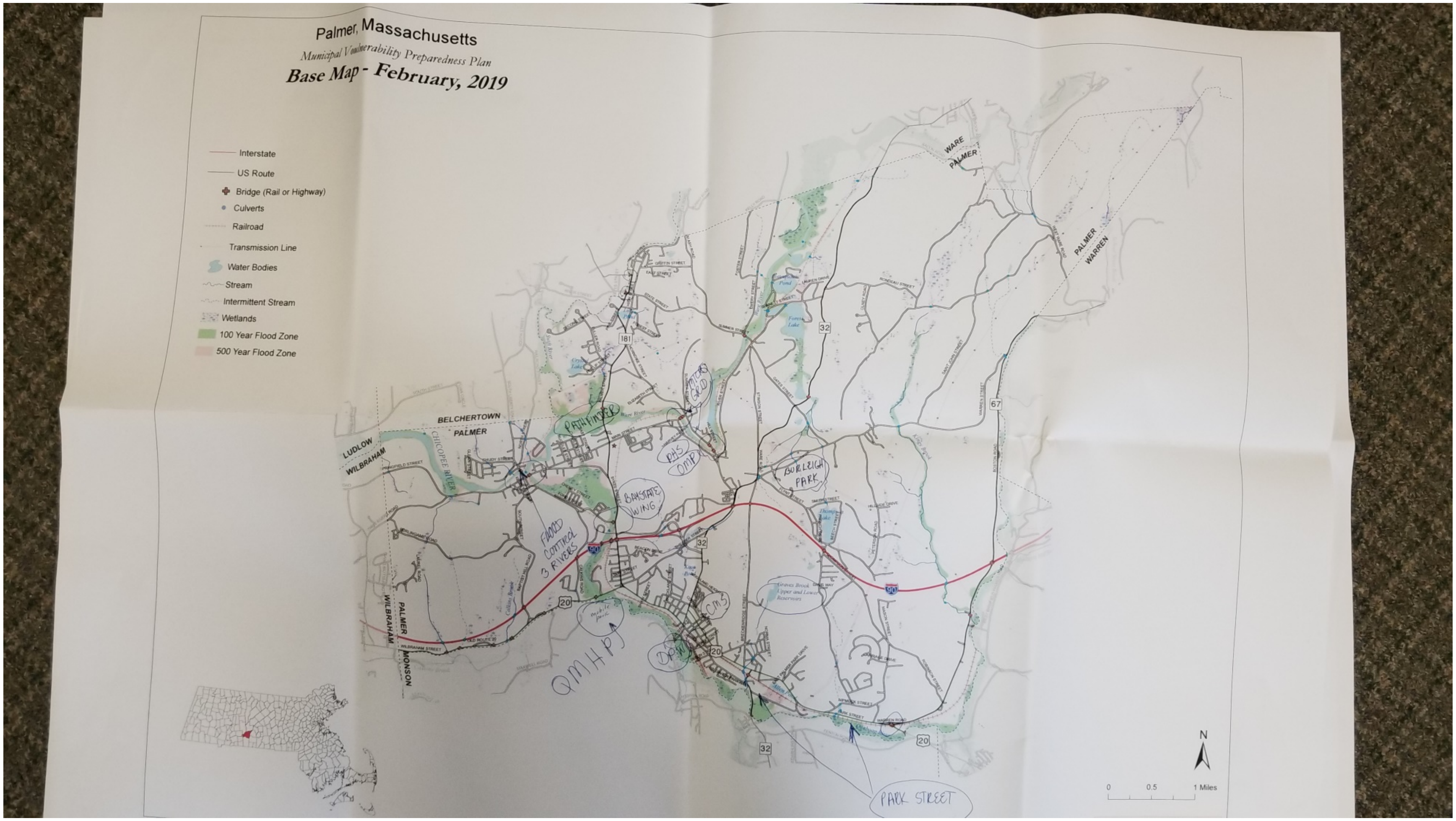
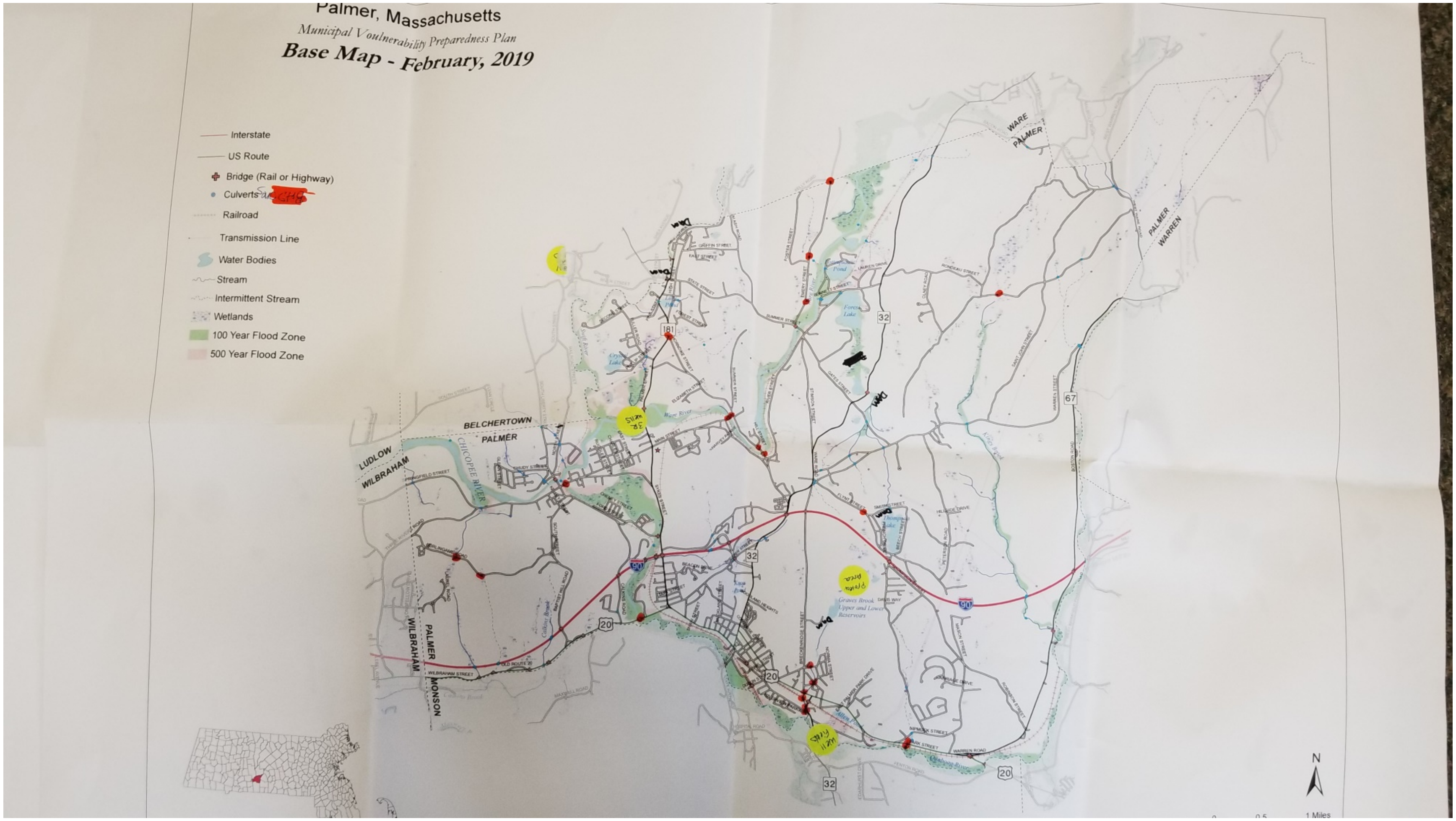
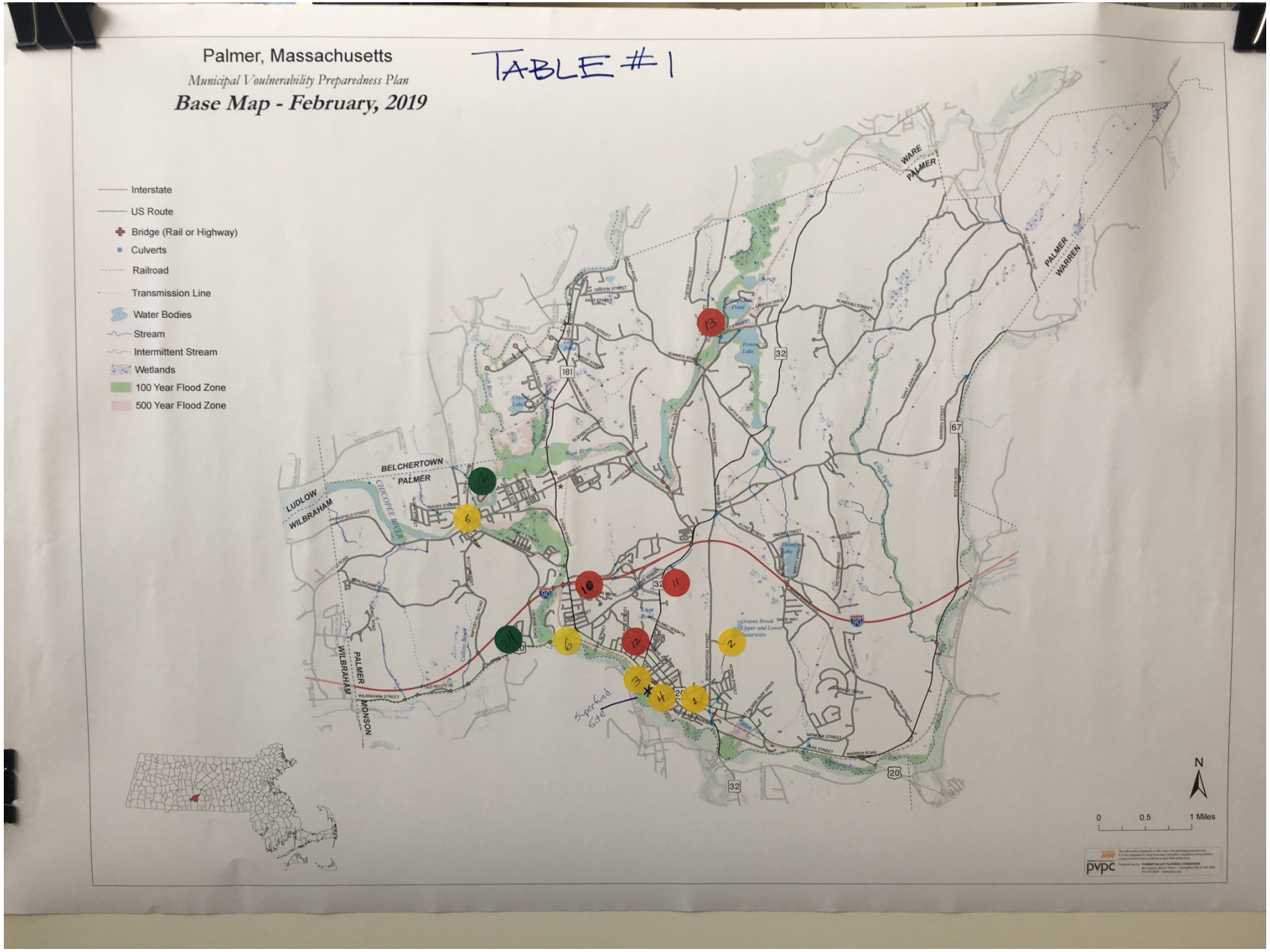
0.5
1 Miles



Palmer, Massachusetts
Municipal Vulnerability Preparedness Plan
Base Map - February, 2019
Interstate
US Route
Bridge (Rail or Highway)
Culverts
Railroad
Transmission Line
Water Bodies
Stream
Intermittent Stream
Wetlands
100 Year Flood Zone
500 Year Flood Zone
BELCHERTOWN
PALMER
LUDLOW
WILBRAHAM
WARE
PALMER
PALMER
WARREN
MONSON
PATHFINDER
BURLEIGH PARK
BAYSTATE WING
FLOOD CONTROL 3 RIVERS
QMHPJ
PARK STREET
0 0.5 1 Miles
N


Palmer, Massachusetts
Municipal Voulnerability Preparedness Plan
Base Map - February, 2019
Interstate
US Route
Bridge (Rail or Highway)
Culverts
Railroad
Transmission Line
Water Bodies
Stream
Intermittent Stream
Wetlands
100 Year Flood Zone
500 Year Flood Zone
BELCHERTOWN
PALMER
LUDLOW
WILBRAHAM
CHICOPEE RIVER
WARE
PALMER
PALMER
WARREN
WILBRAHAM
PALMER
MONSON
Graves Brook Upper and Lower Reservoirs
N
1 Miles


Palmer, Massachusetts
Municipal Voulnerability Preparedness Plan
Base Map - February, 2019
TABLE #1
Interstate
US Route
Bridge (Rail or Highway)
Culverts
Railroad
Transmission Line
Water Bodies
Stream
Intermittent Stream
Wetlands
100 Year Flood Zone
500 Year Flood Zone
BELCHERTOWN
PALMER
LUDLOW
WILBRAHAM
CHICOPEE RIVER
WARE
PALMER
PALMER
WARREN
MONSON
Superfund Site
N
0
0.5
1 Miles
pvpc

APPENDIX C: PARTICIPANT HANDOUTS

Palmer Municipal Vulnerability Preparedness Workshop

DATE: Friday, February 1, 2019

TIME: 8:30a.m. – 4:30p.m.

PLACE: Palmer Police Department

AGENDA

8:30 a.m.	**Registration** – breakfast—review resources, maps, results of survey
9:00 a.m. – 10:30 a.m.	**Introductions/Goal of MVP program for Commonwealth and Palmer**
	Presentation: MVP, Climate Resources, and Priority Hazards
10:30 a.m. – 10:40 a.m.	**Break**
10:40 a.m. – 12:30 p.m.	**Morning Small Team Workshop**

- Identify Community Vulnerabilities and Strengths
- Identify and Prioritize Community Actions

12:30 p.m. – 1:15 p.m.	**Lunch**
1:15 p.m. – 2:45 p.m.	**Afternoon Small Team Workshop**

- Identify and Prioritize Community Actions (continued)
- Identify Priority and Urgency
- Report Outs

2:45 p.m. – 2:55 p.m.	**Break**
2:55 p.m. – 4:00 p.m.	**Large Group Vote on Top Priorities**
	Implementation Design and Final Report Outs
4:00 p.m. – 4:30 p.m.	**Wrap-up and Next Steps—public listening session 4/8/19**

WORKSHOP SIGN-IN SHEETS

Initial	Name	Affiliation	Table
CB	Charlie Blanchard	Town Manager	1
AP	Angela Panaccione	Conservation Agent	2
	Barbara Barry	Town Council	3
	Mary Salzmann	Town Council	1
LB	Lorinda Baker	Town Council	5
	Michelle Sikes	Town Council	2
GS	Gerry Skowronek	DPW	4
JS	Joseph Sawicki	Highway	2
KL	Kenny Lord	WWTP	4
ES.	~~John Janulewicz~~ Erin Sullivan	Police ~~Chief~~ SGT	5
	Alan J. Roy	Fire Chief: Palmer	1
	Scott Turner	Fire Chief: Three Rivers	4
MAH	~~John Daniels~~ Michael Germaine	Fire Chief: Bondsville Rep. Asst. Chief	3
	William Bernat	Fire Chief: Thorndike	2
LL	Linda Leduc	Planning/Economic Develop	1
MM	Michael Marciniec	Planning Board Chair	5
	Paul Burns-Johnson	Planning Board	3
DB	Donald Blais Jr.	Conservation Commission Chair	5
DAC	David Cotter	Conservation Commission V. Chair	4
PIZ	Peter Izyk	Conservation Commission	3
NZ	Nick Zeo	Conservation Commission	1
BC	Branda Cole	Conservation Commission	4
DL	Dorothy Lawrence	Conservation Commission	2
BSW	Bonnie Weeks	Building Inspector/Zoning EO	1
	Sarah Szczebak	Community Development	3
JM	Joshua Mathieu	Dept of Health	5
MJ	Marlene Johnson	Council on Aging	2
J.S.	Jeff Stanhope	Tree Warden Jeffrey Stanhope	5
	Ron Krystofik	Wing Hospital EMD	2
KS	Kelly Sitek	Wing Hospital EMC	3
EH	Ed Hood	Opacum Land Trust	4
HF	Howard Fife	PLMC/Opacum Land Trust	3
	Keith Davies	Chicopee 4 Rivers Watershed	1
SC	Sheila Cuddy	Quaboag Valley CDC	1
	Gail Gramarossa	Quaboag Valley CDC	3
DF	Don Frydryk	Sherman & Fryfryk	1
NB	Nancy Bisnette	Quaboag Valley Coop	4
MC	Michelle Corbeil-Crawford	PHS Environmental Science Teacher	2
SB	Sarah Brodeur	Palmer Land Management Committee (PLMC)	3
	Joe Turek	PRA	5
	William Fay	Three Fay Power / Microgrid	2
	Celeste Fay	Three Fay Power / Microgrid	5
	Pat Gardner	School Superintendent	4
SM	STEPHEN MUNIEC	PALMER SCHOOLS	4
AR	ALAN ROY	PALMER FIRE	5

Initial	Name	Affiliation	Table
GN	George Nolan	Baystate Wing Hospital	1
DC	Dorothy Lawrence	ConCom	2
			3
			4
			5
			1
			2
			3
			4
			5

Municipal Vulnerability Preparedness

Action Implementation Design
COMMUNITY ACTION
Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)
Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)
Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)
Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)
Implementation Milestones Examples: 1. Create and convene a committee to oversee progress; 2. Dissiminate 300 information packets to raise awareness about the initiative; 3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.
Note: Cost estimates take into account the following resources: • Town staff time for grant application and administration (at a rate of $25 per hour) • Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town) • Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Bridges Assess rep Condition of local Thorndike Church +ID Program repair/replacement

Municipal Vulnerability Preparedness

Grp #4

Action Implementation Design

COMMUNITY ACTION

Secure funding to repair/replace deficient bridges. Follow priorities identified by DOT (Thorndike/Church St) DPW Thorndike/Main

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Town Manager Town Council
DPW

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Federal grant application w/ neighboring Towns where bridges border two communities. Partners

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

Engineering analysis underway; 10, Million for each bridge

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Chapter 90 (to an extent) between 4-500,000. - annually
?? Hazard Mitigation Grant / MVP money / Transportation $ from Federal/State govts (Have to be on Transportation Plan TIP)
Local funding for T.I.E. Bond Study

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

Get the T.I.E. Bond Study done
Get on TIP (for Fed eligibility)
Apply for Grants

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Gp #4

Municipal Vulnerability Preparedness

Action Implementation Design update

COMMUNITY ACTION Storm Water Mngt capabilities

1st Determine how Green Solutions could assist in addressing Storm water infrastructure issues

(+ Stream bank mngt.
+ River erosion control) ↑

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

DPW / Conservation Commission Storm Water Coordinator

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Local Land Trusts become My case! DCR/DES Army Corps
Identify other towns/cities that have tackled this.
Help from: Conway School of Design + UMASS Landscape Architecture

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

400,000 - to start ~~MVP ? Mass Wildlife for Green Solutions~~ Grants

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Grant MVP ? Mass Wildlife other grants focused on Conservation Green Solutions

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

(1) Explore grants
(2) Bring to appropriate town groups (CC)
(3) Identify other cities/towns who have experience w/ this & Contact them.

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Emergency Preparedness to know we have plan what protocol that face the town e.g. Climate change #4

Municipal Vulnerability Preparedness

Action Implementation Design
COMMUNITY ACTION Expand Public Education Infrastructure Capacities
① Identify topics/groups for community education ③ Consult w/ town depts (police / fire / Conservation / Health ② Consult existing plans Haz and Mitigation Plans for Pro Conservation Emergency Preparedness
Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)
Town Manager / Emergency Manager — T all Town Dept Heads
Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)
M-Pact Top-Floor Learning local Newspaper Flyers
Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)
?
Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)
Grant application / $ Town allocation
Implementation Milestones Examples: 1. Create and convene a committee to oversee progress; 2. Dissiminate 300 information packets to raise awareness about the initiative; 3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.
① Identify a groups of town citizens/officials to ~~develop~~ priority and develop plans - priorities Emergency Info Education —
Note: Cost estimates take into account the following resources: • Town staff time for grant application and administration (at a rate of $25 per hour) • Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town) • Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Stormwater Management

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

1) Complete & update extensive MS4 system mapping
2) Update impervious surface data
3) Identify areas (critical Area's) for system upgrades & nature based Solutions
4) Replace Failing/undersicled infastructure + Remove Point-Source criticalAreas

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Stormwater Coordinator & DPW

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Con Com, Planning, Rail Roads, MA DOT, Stormwater Coalitions (Central MA + Pioneer valley), MA DEP, EEA, PVPC

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

High (significangtly high = millions)

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Capital Improve, DLTA, New staff time, Grants, Enterprise/Utility

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1. Explore Stormwater Enterprise fund
2. Hire more Staff mapping & Permit Compliance
3. Complete system mapping + impervious cover layer (Consult In-house
4. Foster Inter-departmental Coordination MS4 Compliance
5. Seek grants for system upgrades; LID, Tree, Native based
6. Expand Public outreach & Education generate support
7.

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION develop a new master plan

1. Council convenes a working group made up of:
   - planning board, ZBA, concom, and town council
2. group will explore strategies & source of funding for:
   - writing and implementation of master plan
3. explore grant applications and secure grant funds
4. determine staffing needs
5. hiring of consultants
6. utilize recently developed plans to be incorporated in the master plan

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

The Planning Board

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

- ZBA
- concom
- town council
- PVPC
- stakeholders (key)
- public

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

$75K - $100K

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Town Budget & fed./state/local grant programs/opportunities

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

See community action numbered list for implementation milestones / benchmarks

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
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- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

Drinking Water supply protection.

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Water Districts, Town Administrator

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

DCR, Local Con Com, water commissions

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

High

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

MVP, DCR (Water Supply Protection Trust) MASS WATER RESOURCES AUTHORITY MASS VULNERABILITY PREPAREDNESS

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1) Convene meeting to oversee program, set schedule/timeline
2) Hire outside consultant to conduct analysis of threats to local water supply, particularly related to future climate change hazards/threats.
3) Apply for grants + funding for conservation measures, land agreistons, and other recommended actions

Note: Cost estimates take into account the following resources:
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- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Palmer MVP

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

Relocate DPW garage to move out of flood plain (also consolidate highway & grounds)

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Town manager / Town Council

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Sen. Gobi
Rep. Smola

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000) + $s for land

$20-30k feas. study; const. $6.5 million

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Seek grants; solicit support through debt exclusion

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

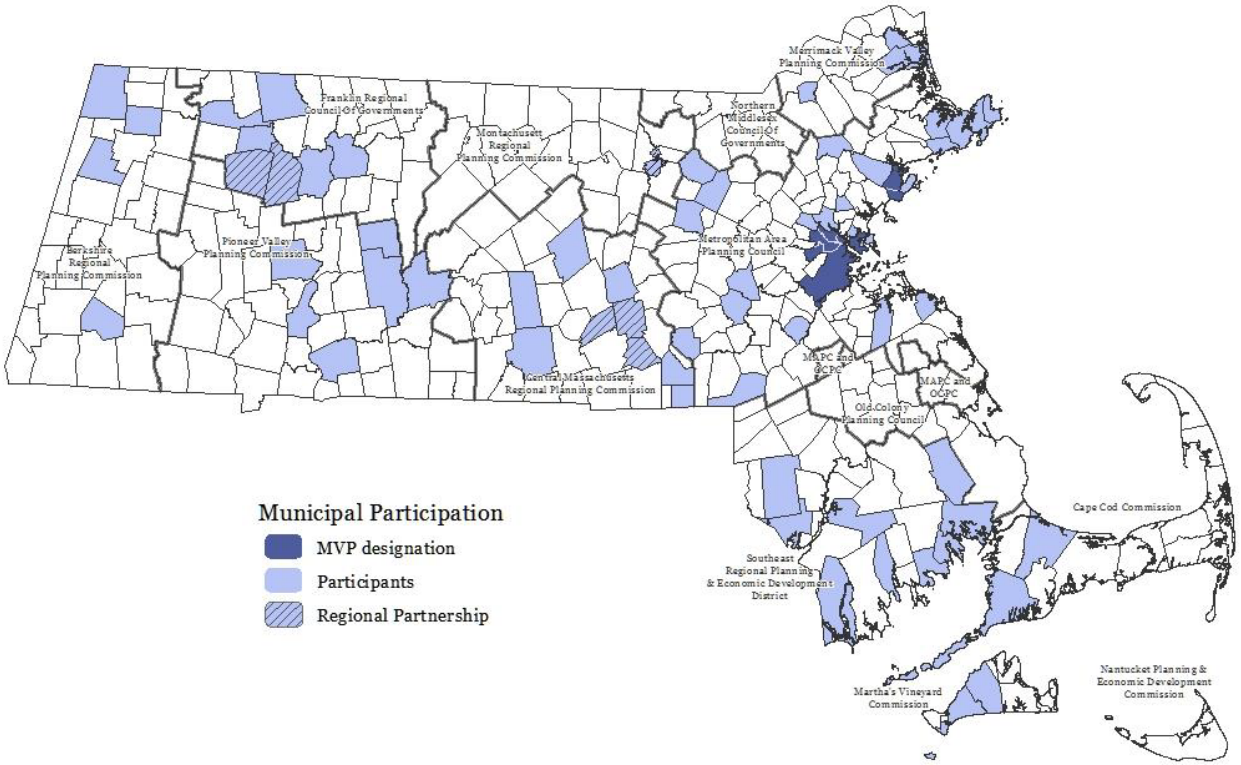
1. Complete update of feasibility study including site identification
2. Gain town approval for debt exclusion (timed w/ retirement w/ library debt) ~2021
3. Construct

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

APPENDIX D: MVP WORKSHOP PRESENTATION

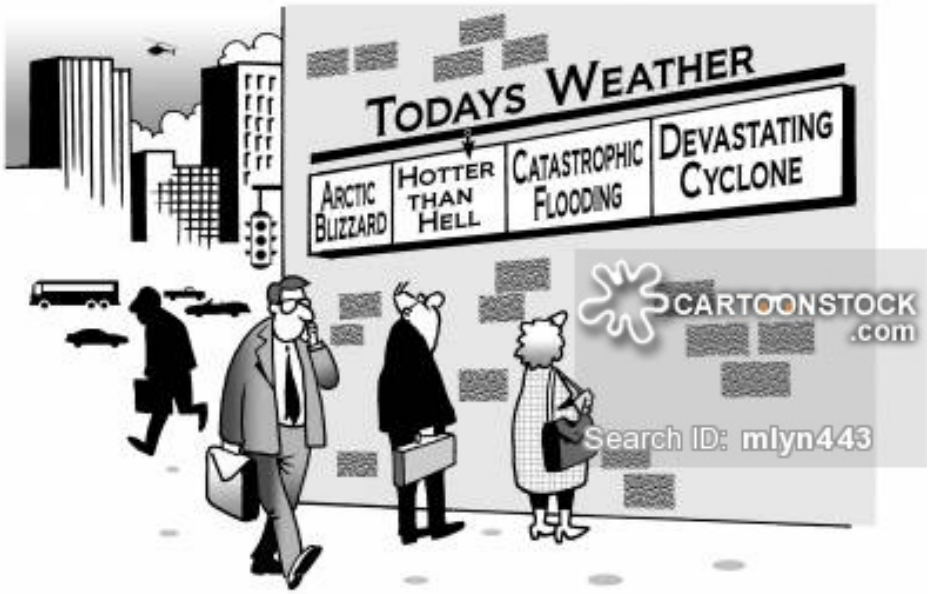
MUNICIPAL VULNERABILITY PREPAREDNESS

Town of
Palmer, MA



Introductions

1. Name
2. Your role in Palmer (staff, board and committee members, business owner, etc.)
3. One area, topic, or idea that you are passionate about, and excited to talk about today



MVP Planning Grant Purpose and Goals

- **Community-led process** that employs local knowledge
- **Mainstream** climate change data
- **Look to communities** as local innovators
- **Coordinate** statewide efforts

Complete workshop – vulnerability assessment and action plan

Preference for projects that propose **"Nature based solutions"**

Community Resilience Building
WORKSHOP GUIDE

Palmer MVP Purpose and Goals

- Share ideas about climate change, impacts, and actions to reduce vulnerabilities
- Become a “MVP “Certified” Community
- Access additional MVP funding to conduct public engagement around sustainability planning!

Outline of Workshop

DURING WORKSHOP

A Prepare for the Workshop

1. Establish a core team with goals.
2. Engage stakeholders.
3. Prepare materials for workshop.
4. Decide on participant arrangements.

B Characterize Hazards

1. Identify past, current, and future impacts.
2. Determine the highest-priority hazards.

C Identify Community Vulnerabilities and Strengths

1. Identify infrastructural vulnerabilities and strengths.
2. Identify societal vulnerabilities and strengths.
3. Identify environmental vulnerabilities and strengths.

D Identify and Prioritize Community Actions

1. Identify and prioritize infrastructural actions.
2. Identify and prioritize societal actions.
3. Identify and prioritize environmental actions.

E Determine the Overall Priority Actions

1. Identify highest-priority actions.
2. Further define urgency and timing.

F Put It All Together

1. Generate final workshop products.

Community Components

Infrastructural

Societal

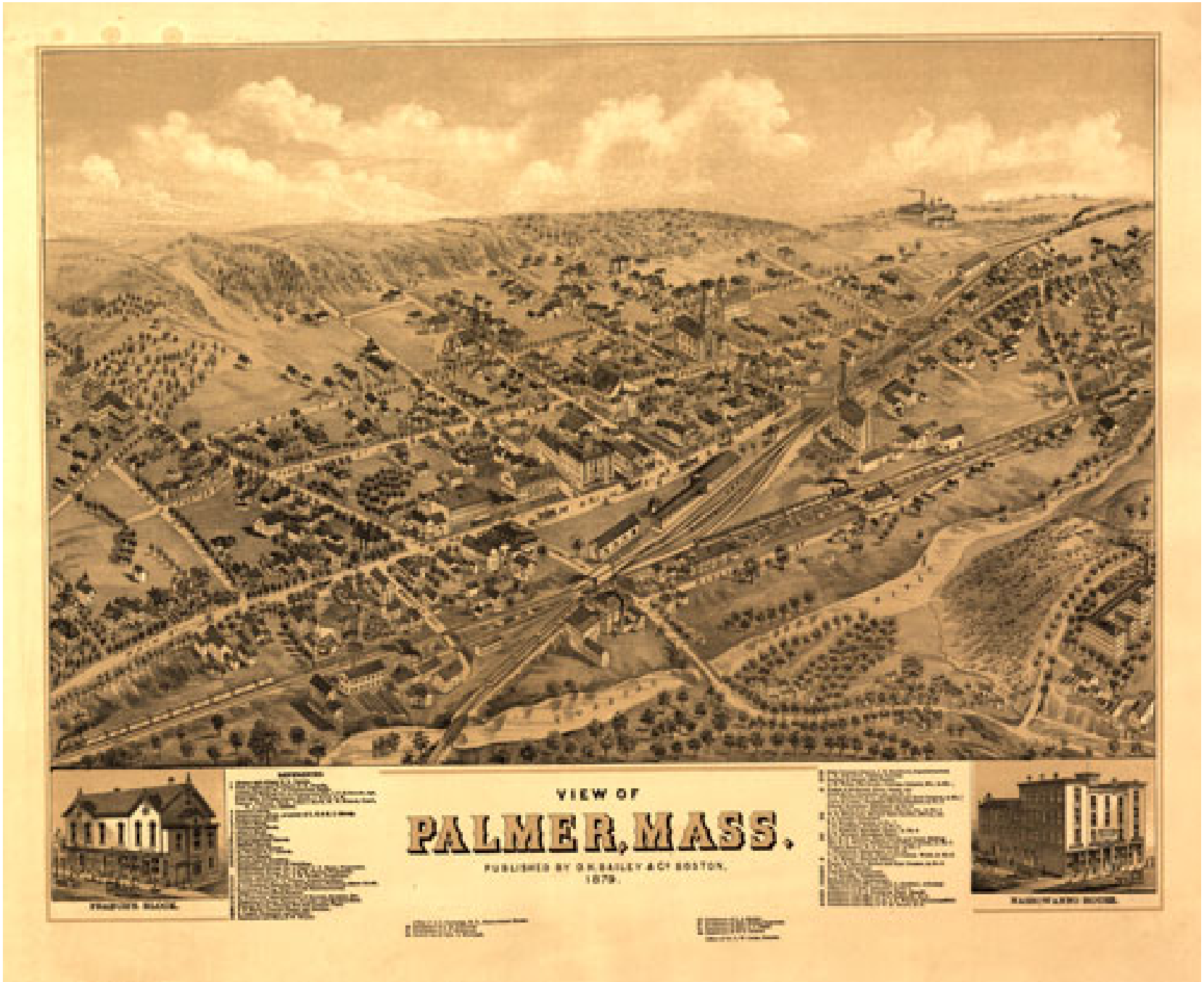
Environmental

Agenda

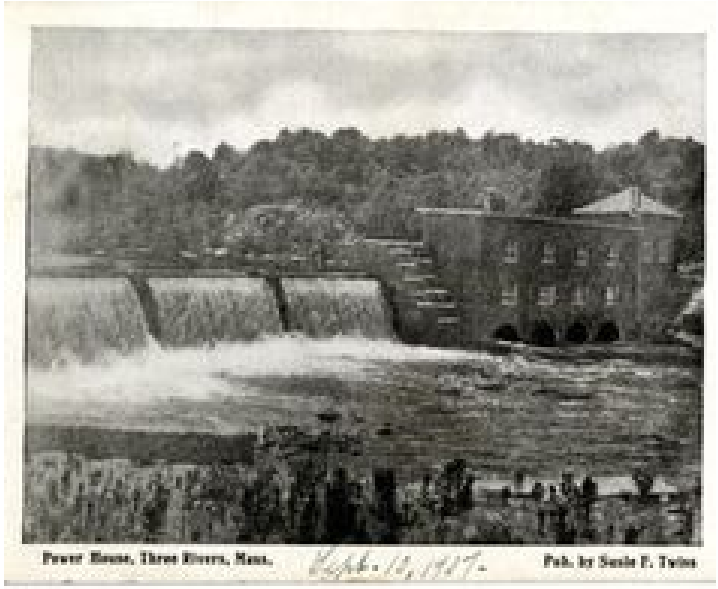
Time	Activity
8:30 a.m.	Registration
9:00 a.m.	Introductions, Climate Resources, and Priority Hazards
10:30 a.m.	Break
10:40 a.m.	Small Team: ID/Map Community Vulnerabilities and Strengths
11:30 a.m.	Small Team: Identify and Prioritize Community Actions
12:30 p.m.	Lunch
1:00 p.m.	Small Team: Identify and Prioritize Community Actions (Cont.)
2:00 p.m.	Small Team: Identify Priority and Urgency
2:15 p.m.	Report Outs
2:45 p.m.	Break
2:55 p.m.	Vote on Top Priorities Implementation Design Exercise
4:00 p.m.	Wrap-up and Next Steps

What Changes in the Natural Environment Have You Noticed Over the Course of Your Lifetime?

Changes in Palmer's Environment


VIEW OF
PALMER, MASS.
PUBLISHED BY O.H. BAILEY & Co. BOSTON.
1879.

Concerns and Challenges



Location, location, location

Historic settlement in proximity to water power = Present day centers of employment in or near floodplains

32 structures located in Special Flood Hazard Area (SFHA)

19 bridges/culverts located on Evacuation Routes

Concerns and Challenges

- Flooding – in 1955 60% of Town had to rebuild
  - Under-sized /blocked culverts
  - Beaver-damaged drainage infrastructure
  - Hazardous Materials—transported through community
- Significant Hazard Dams ➔ Dam Failure (no high hazard)
- Snowstorms/Ice storms
- Hurricanes/ Tropical Storms
- Extreme heat— vulnerable popl

Past and Ongoing Actions

- Eliminated 26 overflow points of direct discharge to Chicopee, Quaboag, Swift and Ware rivers
- After 1955 flood—channel of Chicopee river significantly deepened and widened
- Effective zoning & other land use regulations to mitigate long term effects of inevitable natural hazards

Microgrid Study

- MassCEC's Community Microgrids program awarded $75,000 for feasibility study in **Palmer**
- Microgrid feasibility study by Thorndike Energy, leveraging its existing solar and hydropower assets.
- Support emergency response providers as well as critical facilities, including Baystate Wing hospital, local food sources, and the school/emergency shelter.
- Town of Palmer, Thorndike Energy, Eaton, Baystate Wing Hospital, Big Y, Palmer Redevelopment Authority

Past Planning

- Up to date Hazard Mitigation Plan
- Up to date Open Space & Recreation Plan
- Community Development Plan
- Capital Improvements Plan
- Corridor Plan

Palmer's Assets and Features

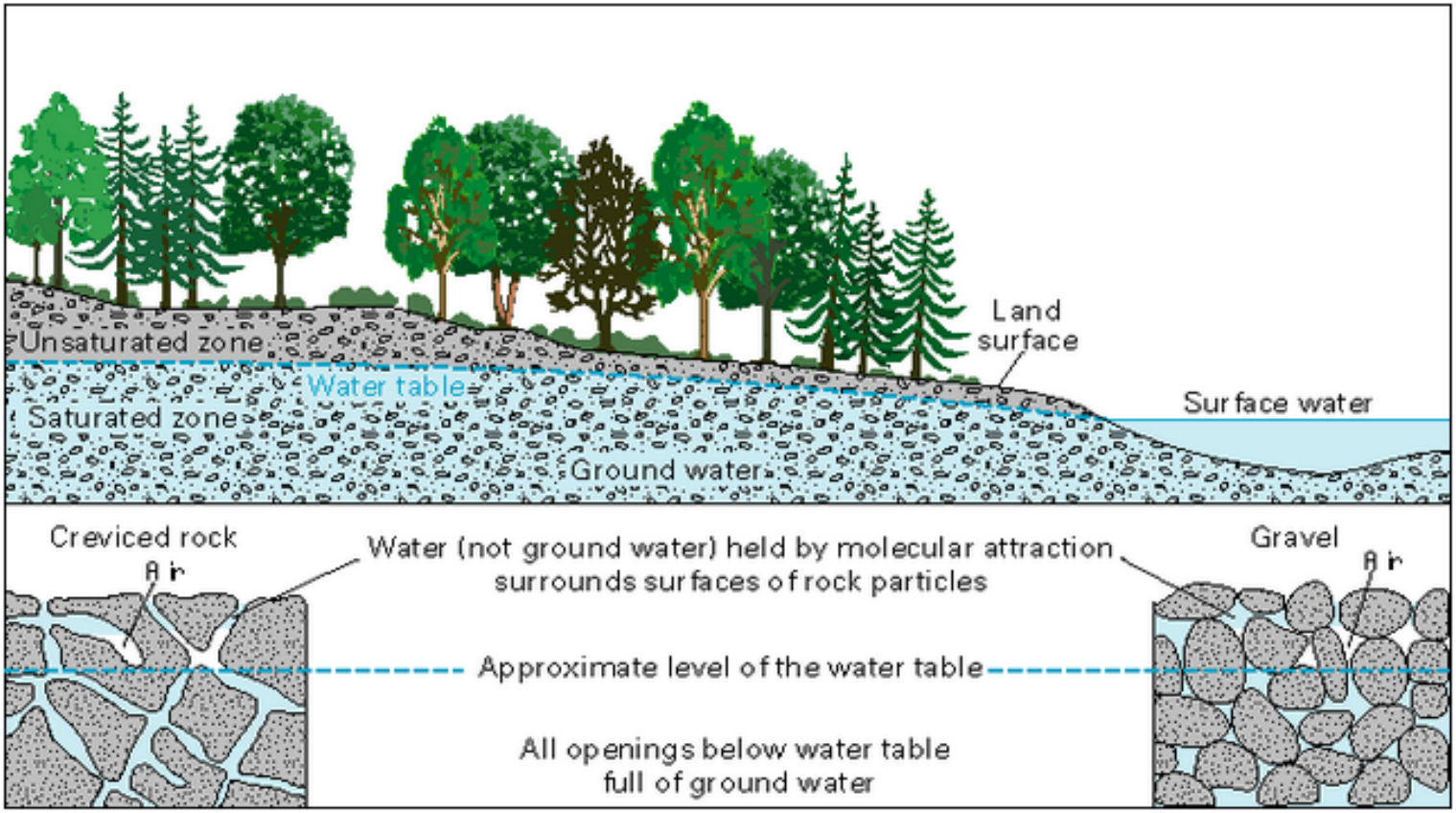
- Leader – Green Communities—reducing muni energy use
- 68% land is undeveloped forestland
- Track Record of action to solve problems
- Floodplain overlay district combined with Conservation Commission oversight, successfully limits development in hazard areas
- Three active rail lines & East West Rail study underway

Drinking water

Three characteristics that shape nature of supply

Thanasis Zovoilis / Getty Images

- Geology
- Soils
- Land use/forest cover

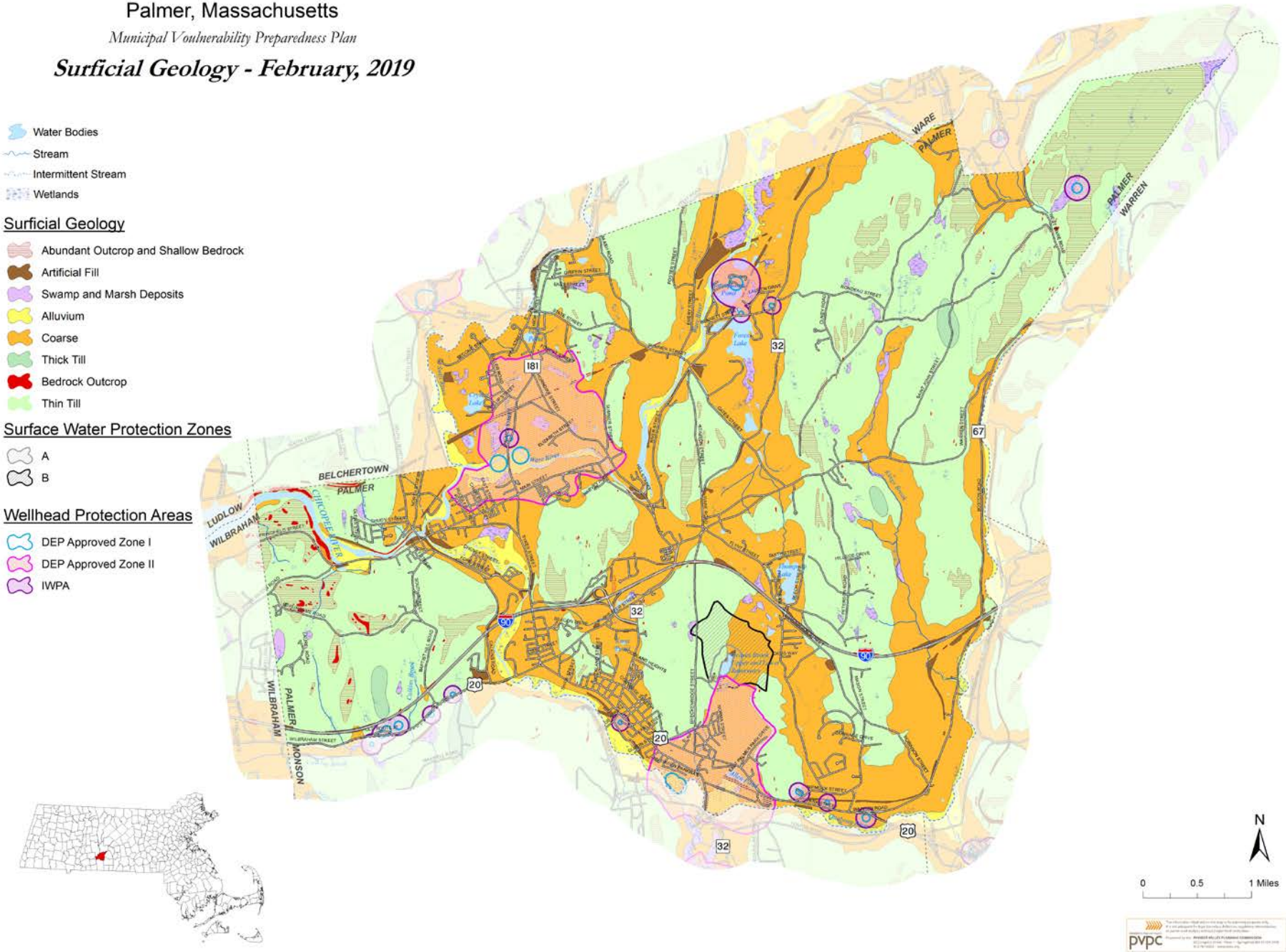


https://water.usgs.gov/edu/earthgwaquifer.html

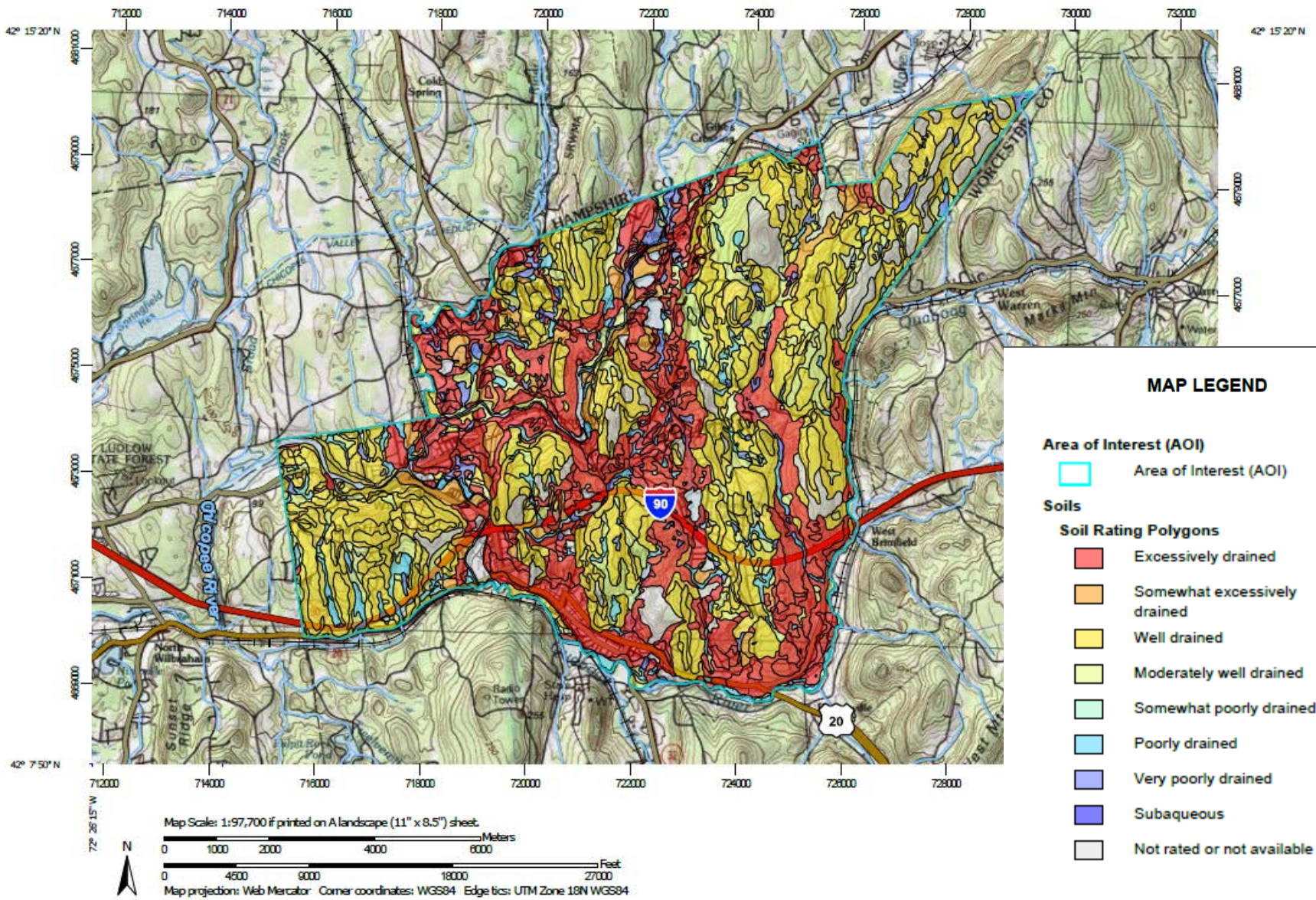
Palmer, Massachusetts

Municipal Voulnerability Preparedness Plan

Surficial Geology - February, 2019



Drainage Class—Hampden and Hampshire Counties, Massachusetts, Eastern Part; Hampden County, Massachusetts, Central Part; and Worcester County, ...
(PALMER)



Map Scale: 1:97,700 if printed on A landscape (11" x 8.5") sheet.

Meters: 0 1000 2000 4000 6000

Feet: 0 4500 9000 18000 27000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

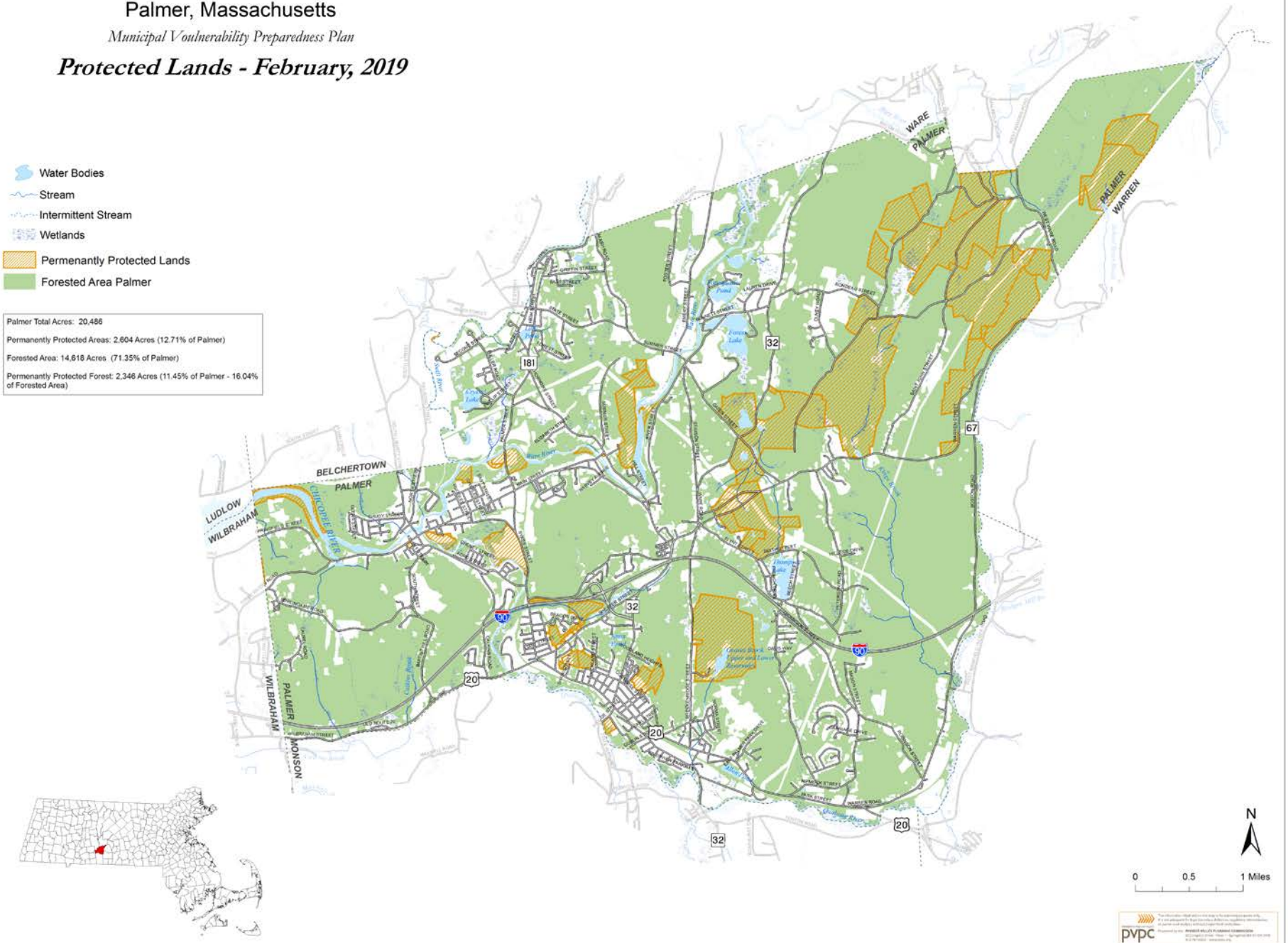
Soil Rating Polygons

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Palmer, Massachusetts

Municipal Voulnerability Preparedness Plan

Protected Lands - February, 2019

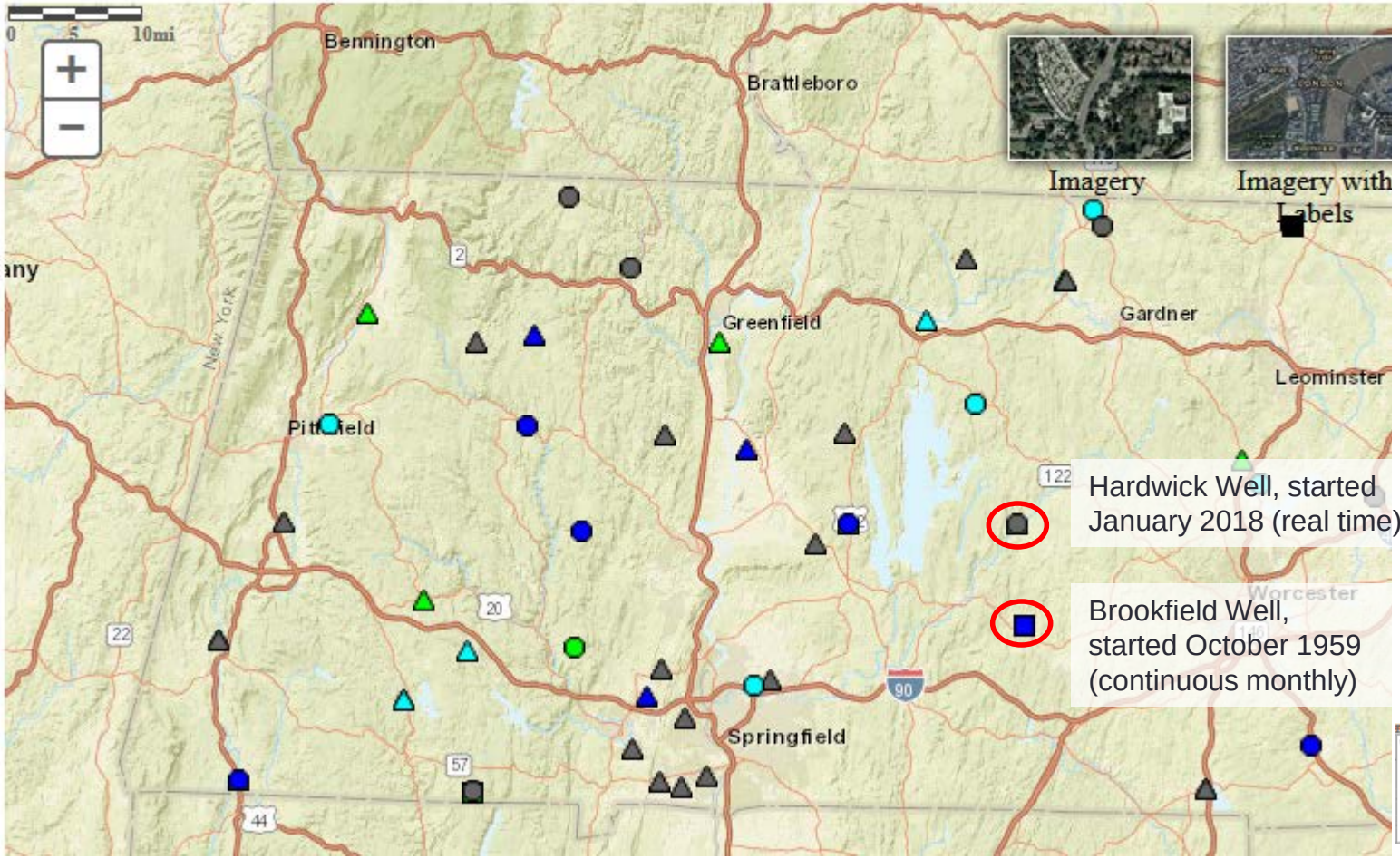


USGS science for a changing world

Groundwater Watch

Massachusetts Active Water Level Network

Click site symbol to open information pop-up. Click Station ID in pop-up for county information and sit
Map loading slowly? Try a different browser. Web browser performance varies significantly

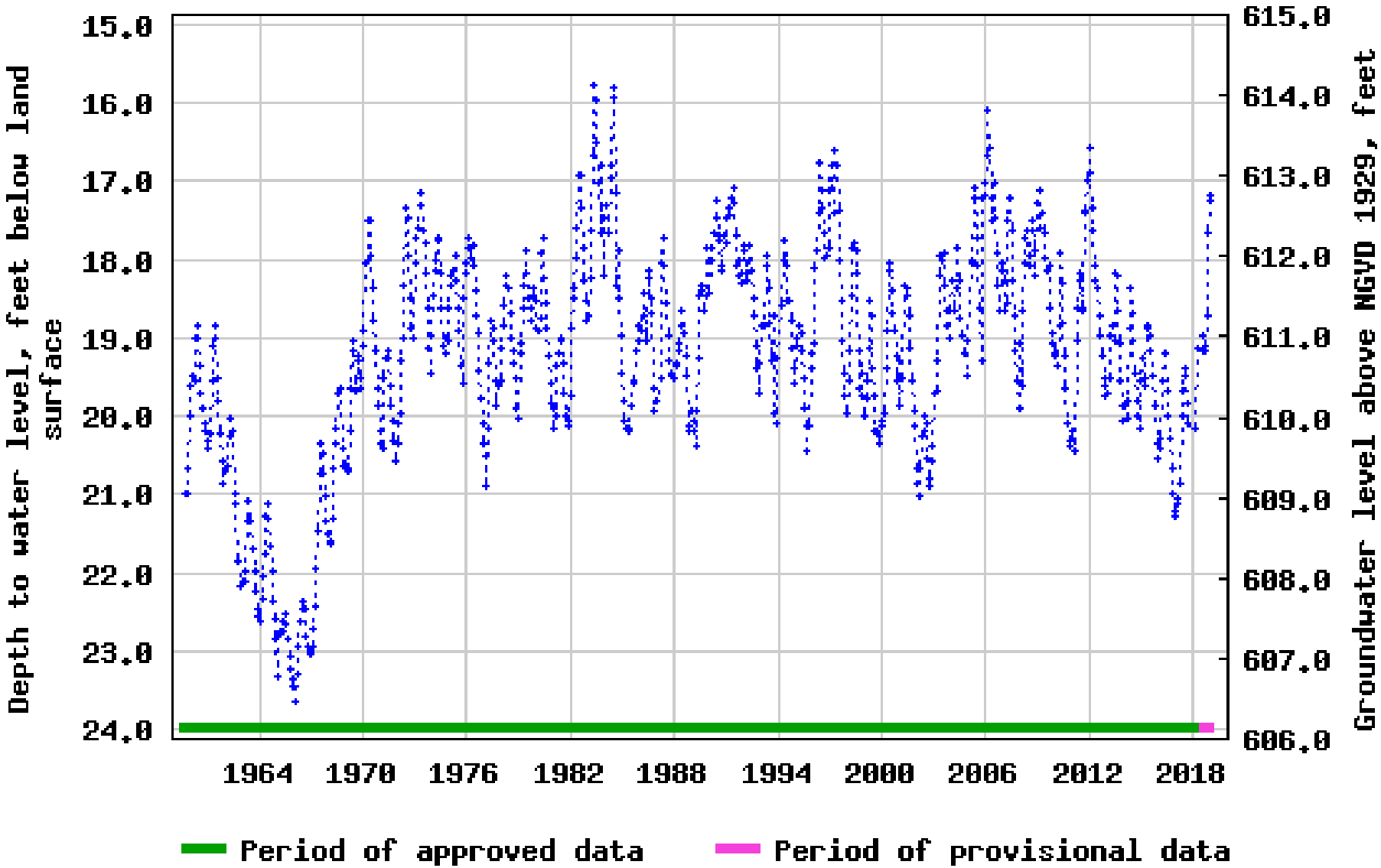


Hardwick Well, started January 2018 (real time)

Brookfield Well, started October 1959 (continuous monthly)

USGS

USGS 421410072081301 MA-WUW 2 WEST BROOKFIELD, MA



Well depth: 43 feet below land surface, completed in glacial outwash (sand and gravel)

What do we know about drinking water?

- 50% of Town on private wells and 50% purchase water through one of the four water districts
- Supply both groundwater and surface supply
- Water district wells all have “high susceptibility to contamination” based on nearby land uses (MassDEP SWAP reports, 2002)
- Nearest USGS groundwater well shows clear responses to major droughts and precipitation events

Stormwater

- Stormwater system aged, 80 years old
- Poor condition, inadequate capacity

Source: P. Gambarini

Localized flooding

MENU WESTERN MASS NEWS NEWS WEATHER TRAFFIC BETTER JOBS 28°

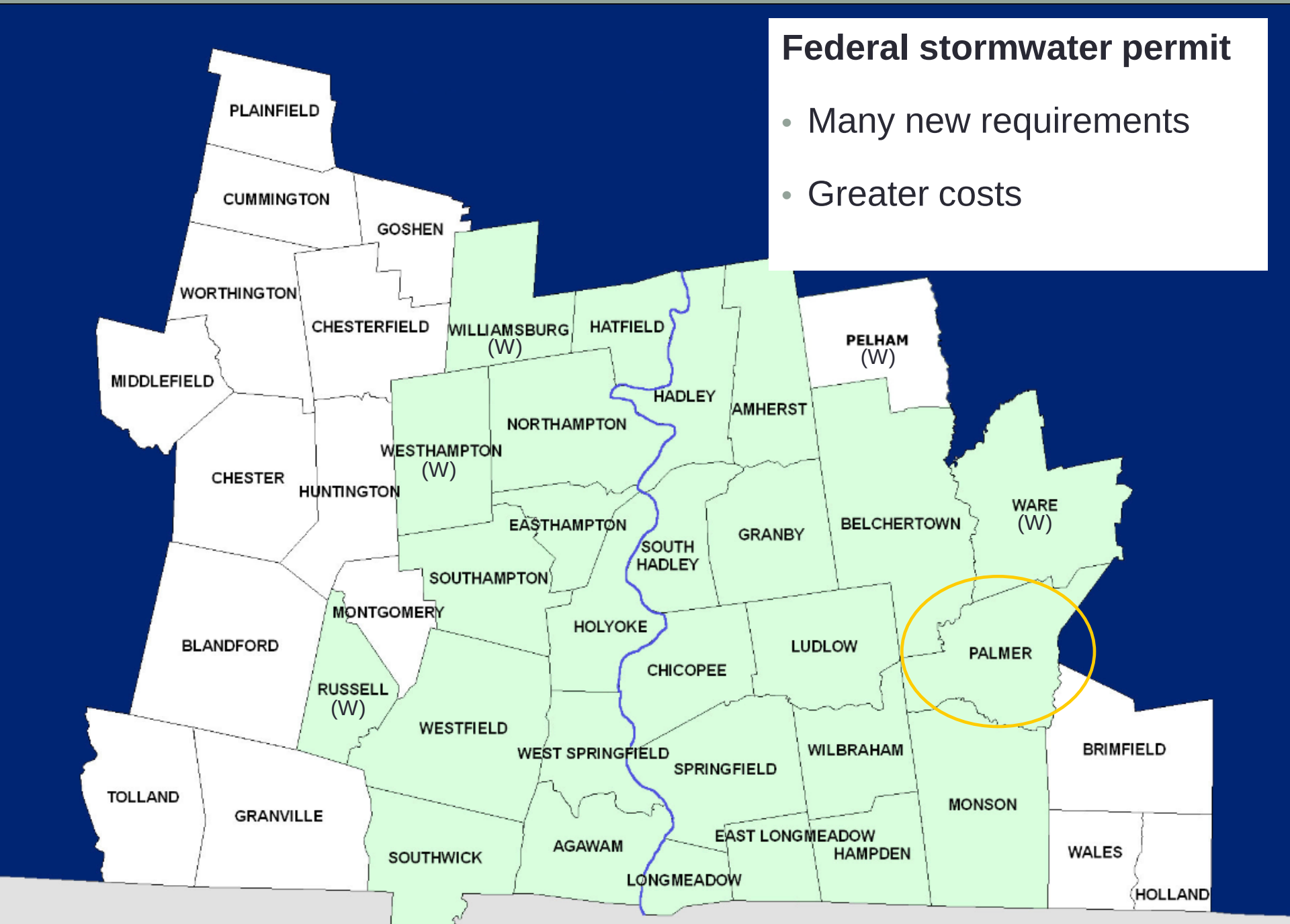
Drain issue creating icing, flooding concerns for Palmer business

Posted Jan 10, 2018

Drain issue creating icing, flooding concerns for Palmer business

Federal stormwater permit

- Many new requirements
- Greater costs



Permit elements that may help w/ resilience

- New development standards (LID / nature based solutions)
- Mapping of municipal storm system and inspections of outfalls and interconnections
- More frequent cleaning of catch basins

Massachusetts Green High Performance Computing Center, Holyoke

What does Climate Vulnerability Preparedness Look Like to You?

Global Climate Trends

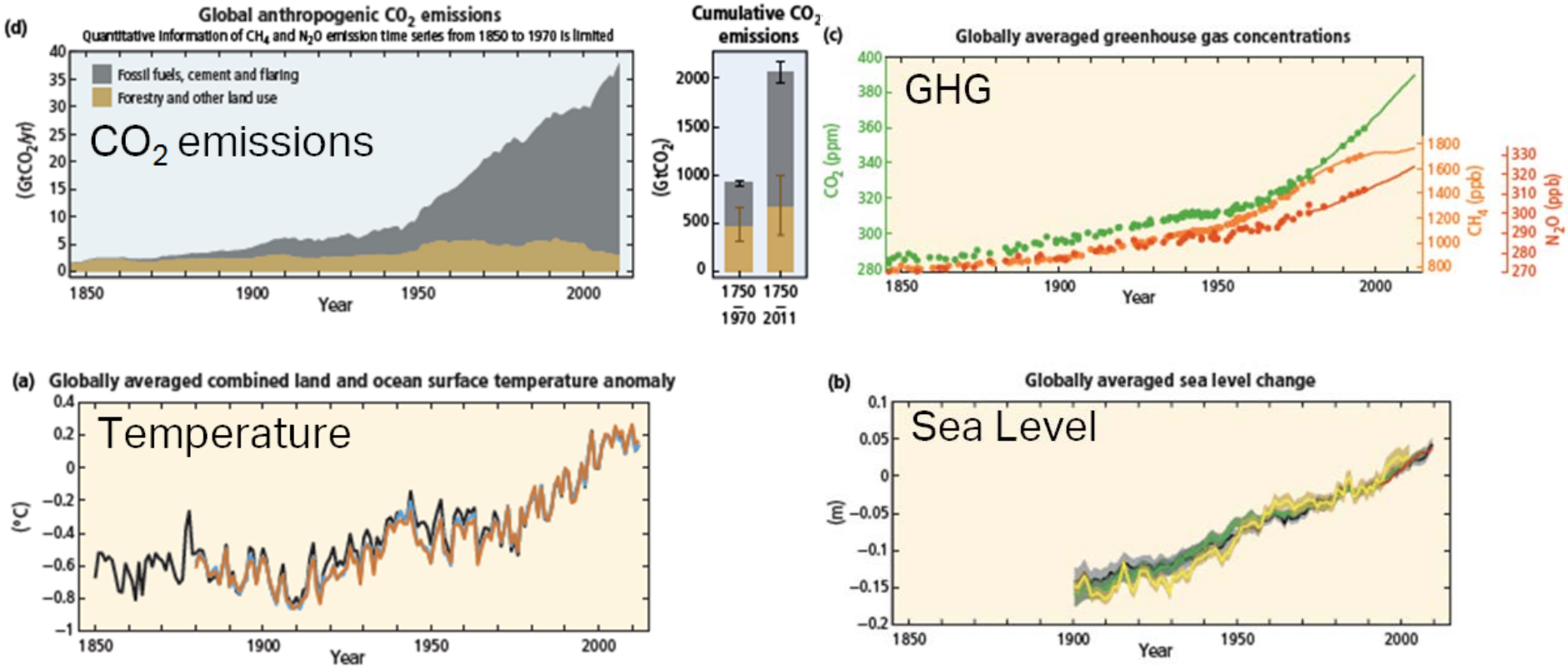
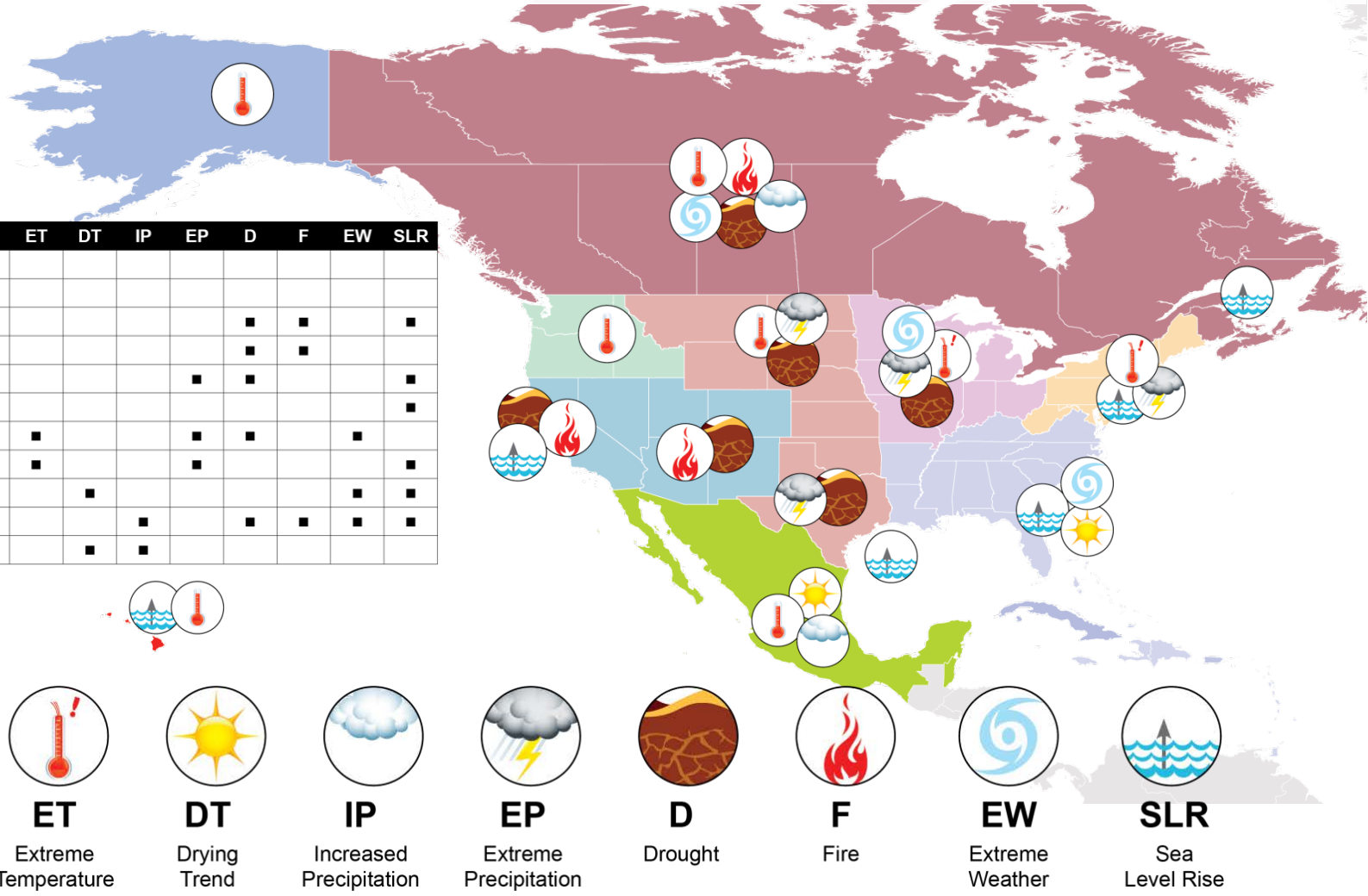


Image: IPCC 2014

- 14 of 15 hottest recorded years since 2000
- July, August 2016, then July 2017 – hottest months on record

High Level Overview of Climate Change Trends in North America

REGION	WT	ET	DT	IP	EP	D	F	EW	SLR
Alaska & Arctic	■								
Northwest	■								
California						■	■		■
Southwest						■	■		
Great Plains	■				■	■			■
Hawaii	■								■
Midwest		■			■	■		■	
Northeast		■			■				■
Southeast & Caribbean			■					■	■
Canada	■			■		■	■	■	■
Central America & Mexico	■		■	■					



WT Warming Trend

ET Extreme Temperature

DT Drying Trend

IP Increased Precipitation

EP Extreme Precipitation

D Drought

F Fire

EW Extreme Weather

SLR Sea Level Rise

Information adapted from NCA (2013) and IPCC AR5 (2014)

U.S. $ Billion Disasters

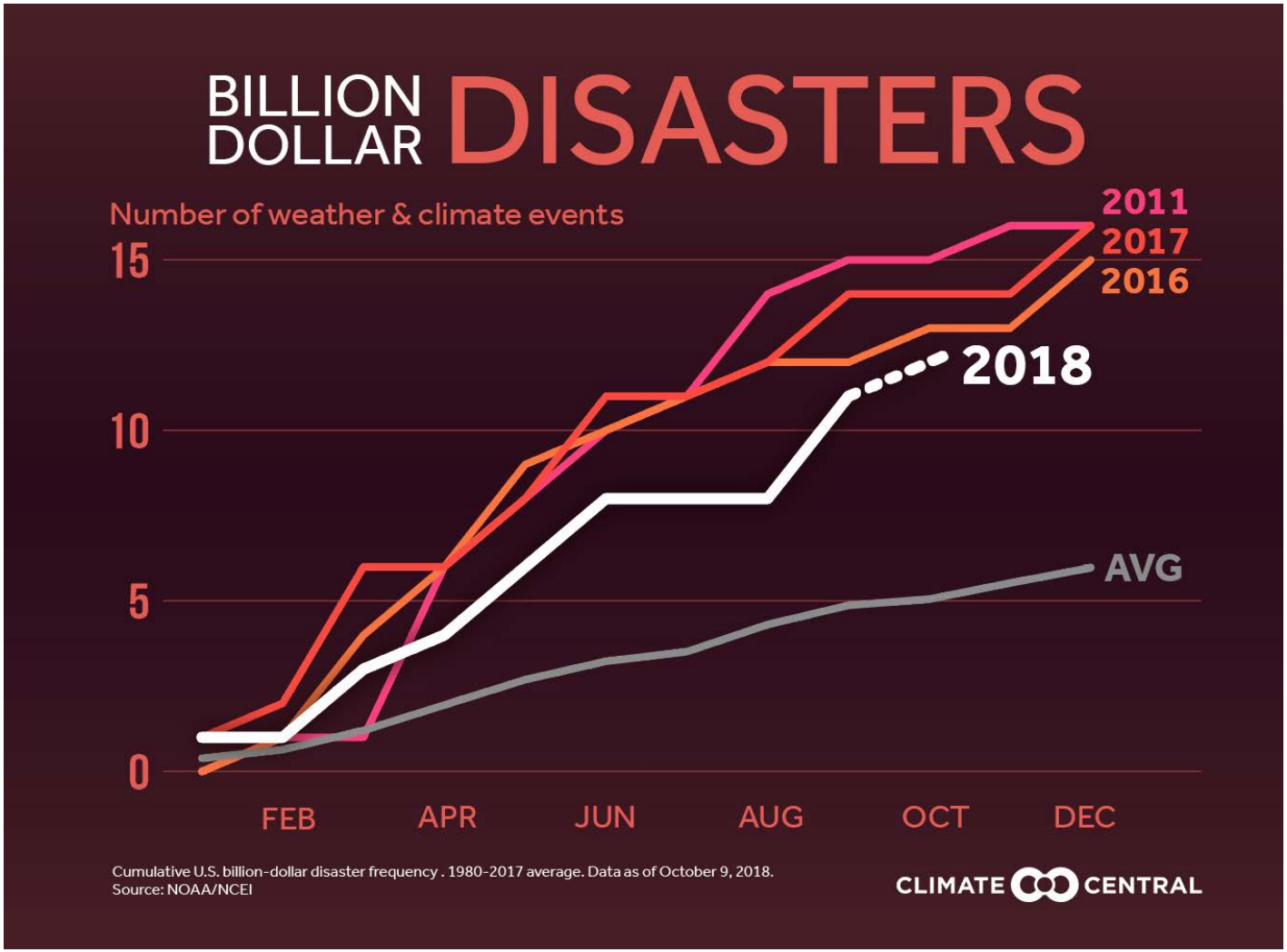


Image: Climate Central 2018

U.S. Stats

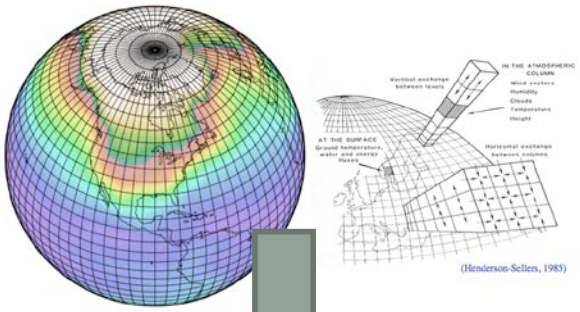
2017 - 16 billion $ disasters, tying 2011

2018 – 11 billion $ disasters as of early November, excluding CA wildfires and Hurricane Michael

MA Climate Projections

- Statewide projections comprised of county-and basin-level information

Global Climate Models (GCMs)



Latest, state of the art climate model simulations (CMIPS) used in the IPCC report (2013)

Model Selection
Rigorous assessment of model performance and projections

Karmalkar et al., *under review*

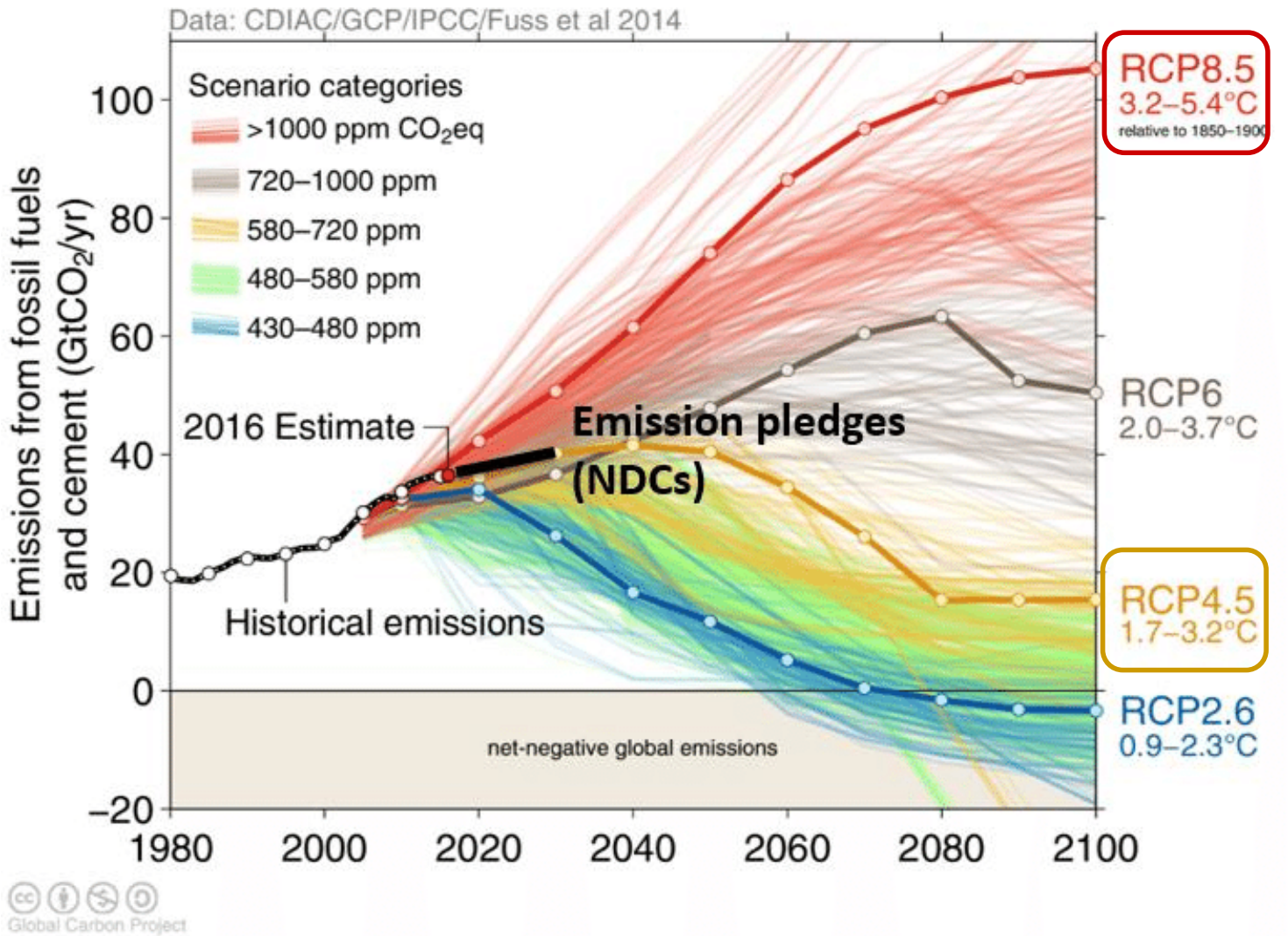
Daily data for MA at 6-km resolution

DOWNSCALED MODEL DATA

Statistical Downscaling

Pierce at al., 2014

Emission Scenarios



HIGH EMISSIONS SCENARIO

MEDIUM EMISSIONS SCENARIO

Chicopee River Basin Climate Projections

By 2100

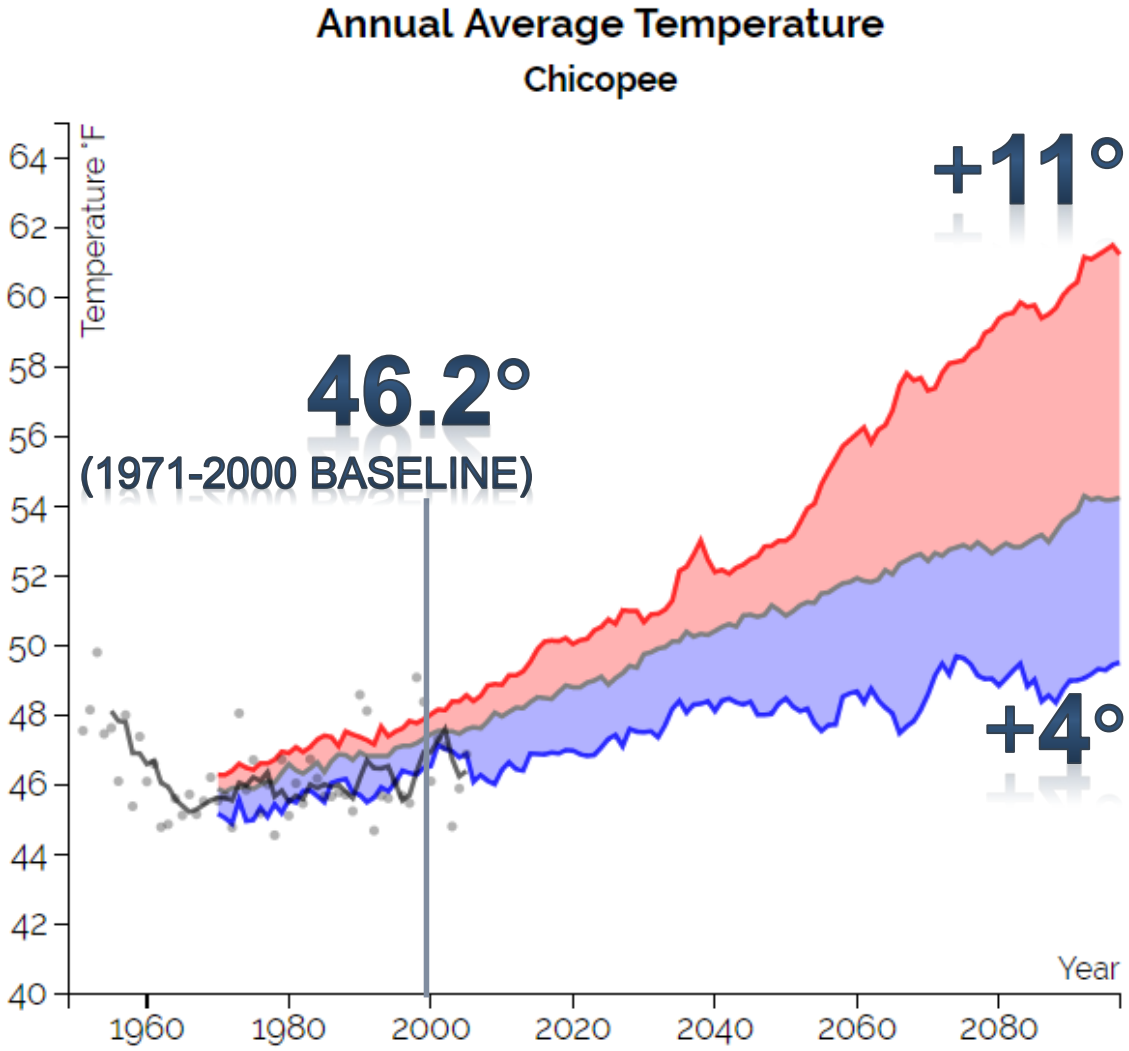
- Increase (↑) in:
  - Average temperatures
  - Min and max temperatures
  - # of days with temps over 90, 95, and 100
  - Cooling degree days (65 and above)
  - Winter precipitation
  - Frequency of heavy precipitation (winter)
- Decrease (↓) in:
  - # of days below 32 and 0
  - # of heating degree days (65 and below)
  - Fall precipitation (potential)

Average Temperatures

- ↑ in annual and seasonal average, max., and min. temps
- Summer highs may ↑ 9% by 2050, up to 17% 2100
- Fall highs may ↑ 12% by 2050, up to 20% 2100

Impacts

- Rain v. snow
- Ecosystem viability
- Consecutive dry days
- Drought and fire

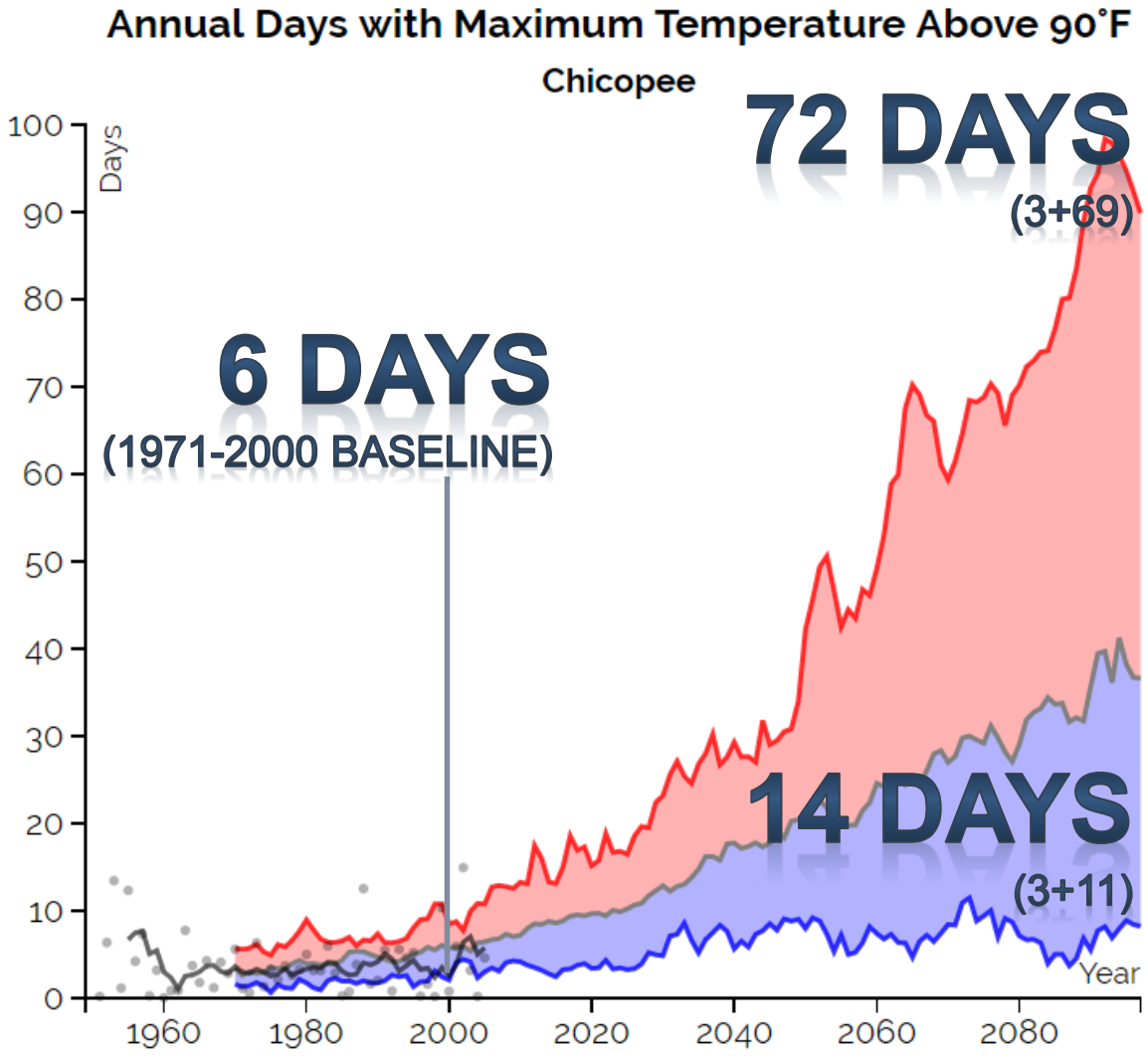


Extreme Temperatures

- By 2100, up to +56 days above 90 in summer, +9 days above 90 in fall.
- Major jump w/ high emissions scenarios

Impacts

- Heat impacts vulnerable pops.
- ↑ in cooling degree days

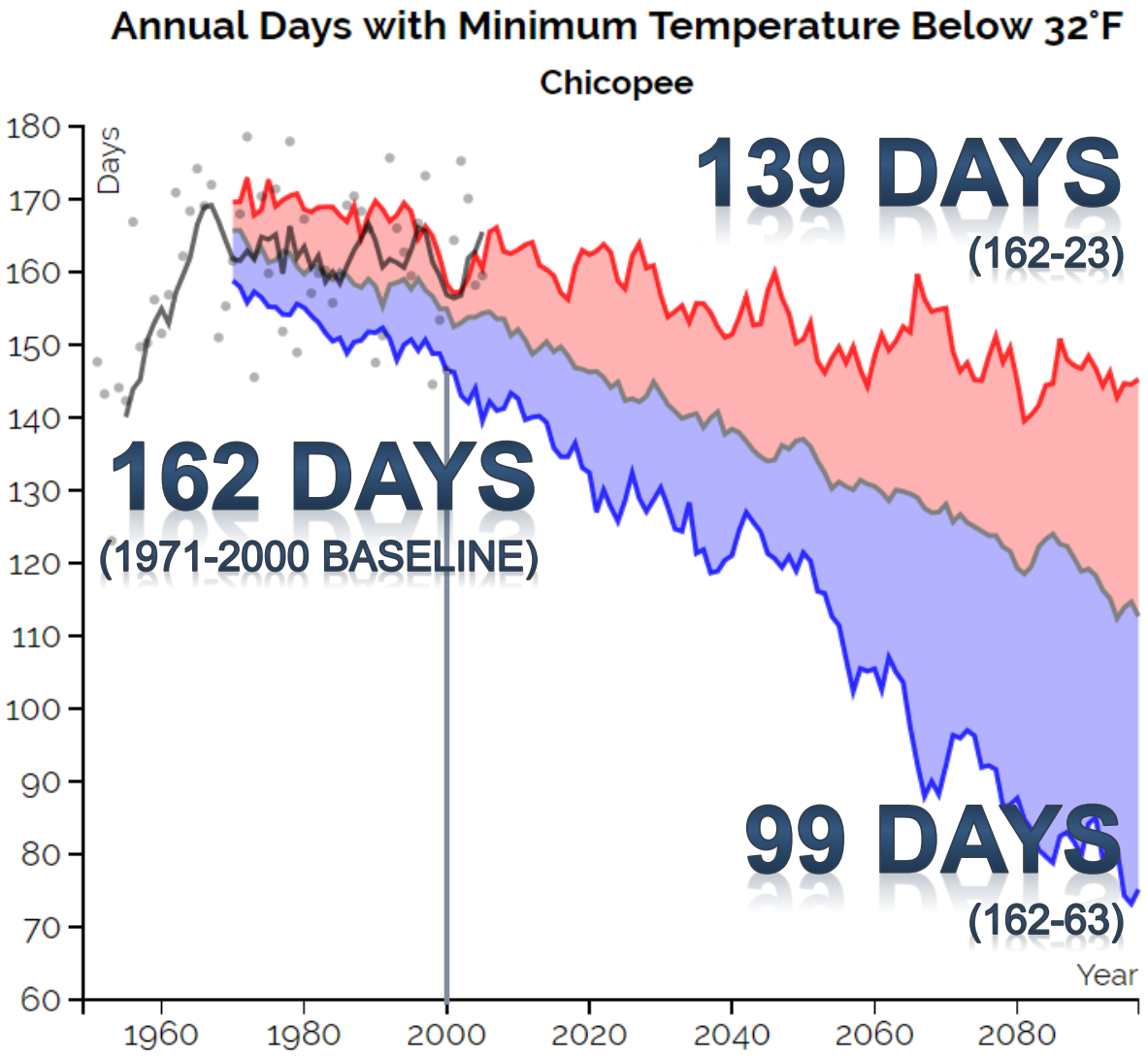


Cold Temperatures

- Fewer days below 32° and 0°
- ↓ in 32° days by 2050 projected in fall and spring
- ↑ length of frost-free season

Impacts

- Pests and insects
- Vegetative growing season
- Maintenance costs

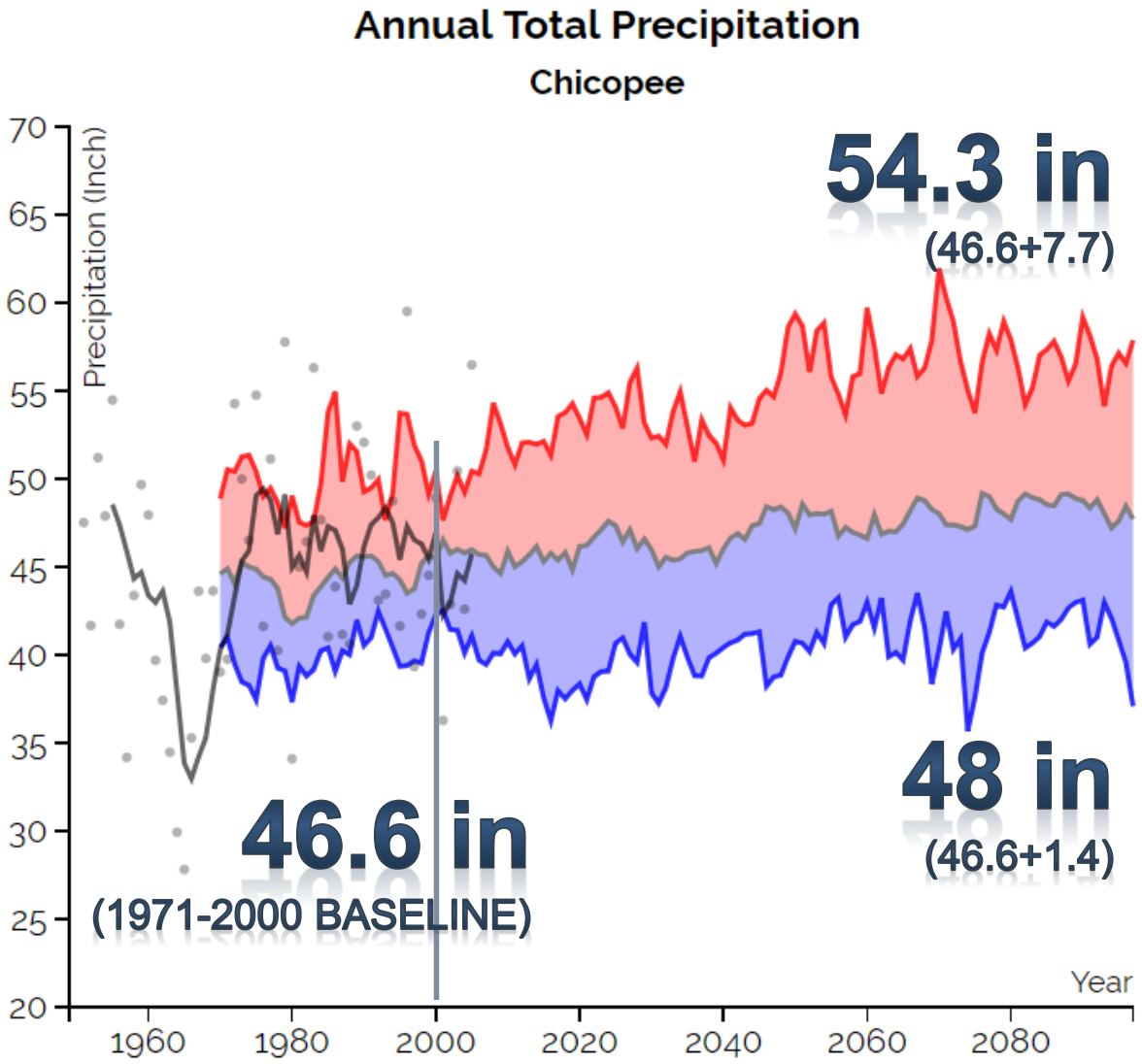


Precipitation

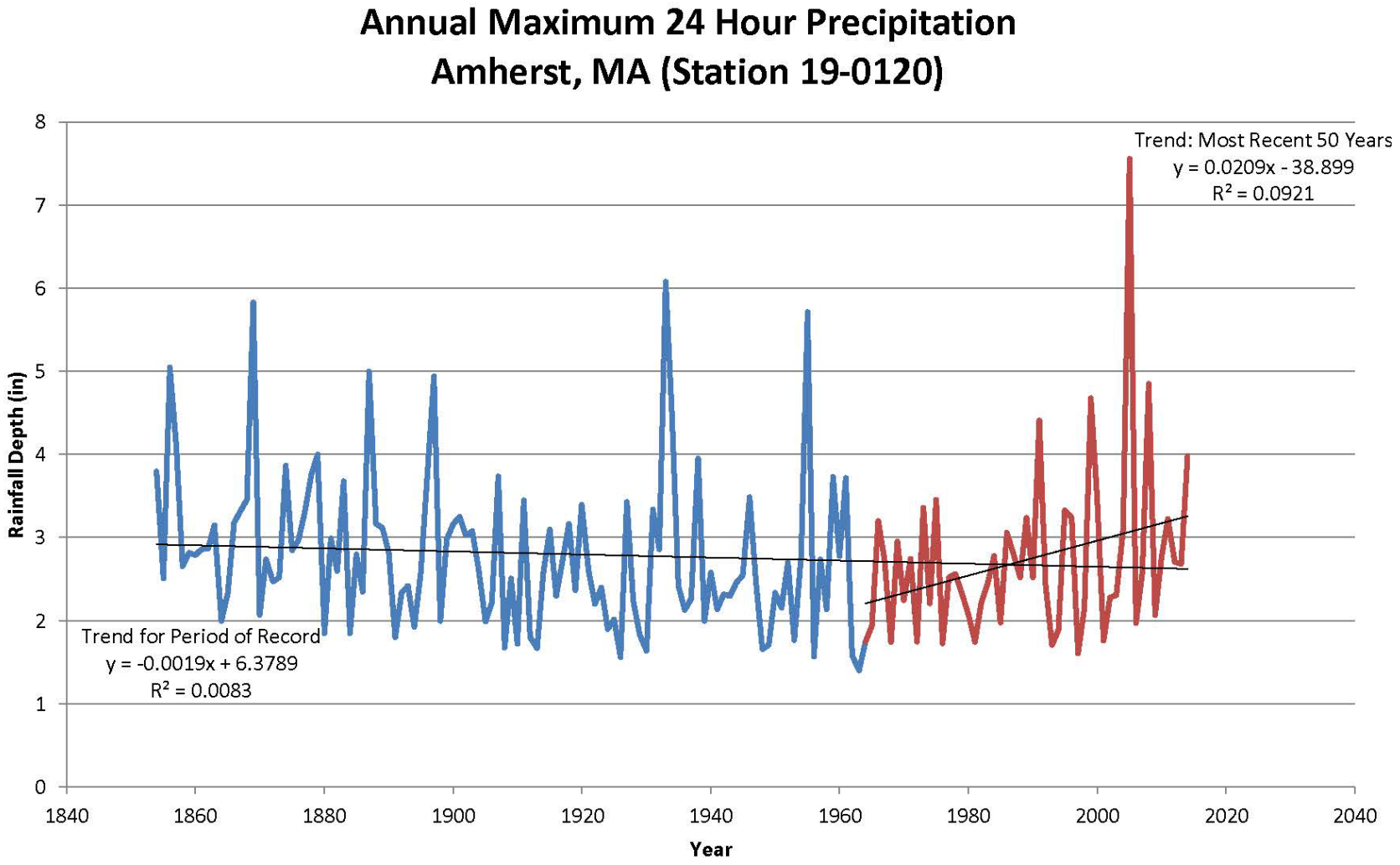
- Annual total precipitation ↑ 1.3 – 6.2” by 2050
- Greatest ↑ in spring and winter

Impacts

- Winter rain
- Reduced snow cover and ice melt



Historical Trend: Maximum Precipitation



Source: Linnean Solutions

Precipitation >1”

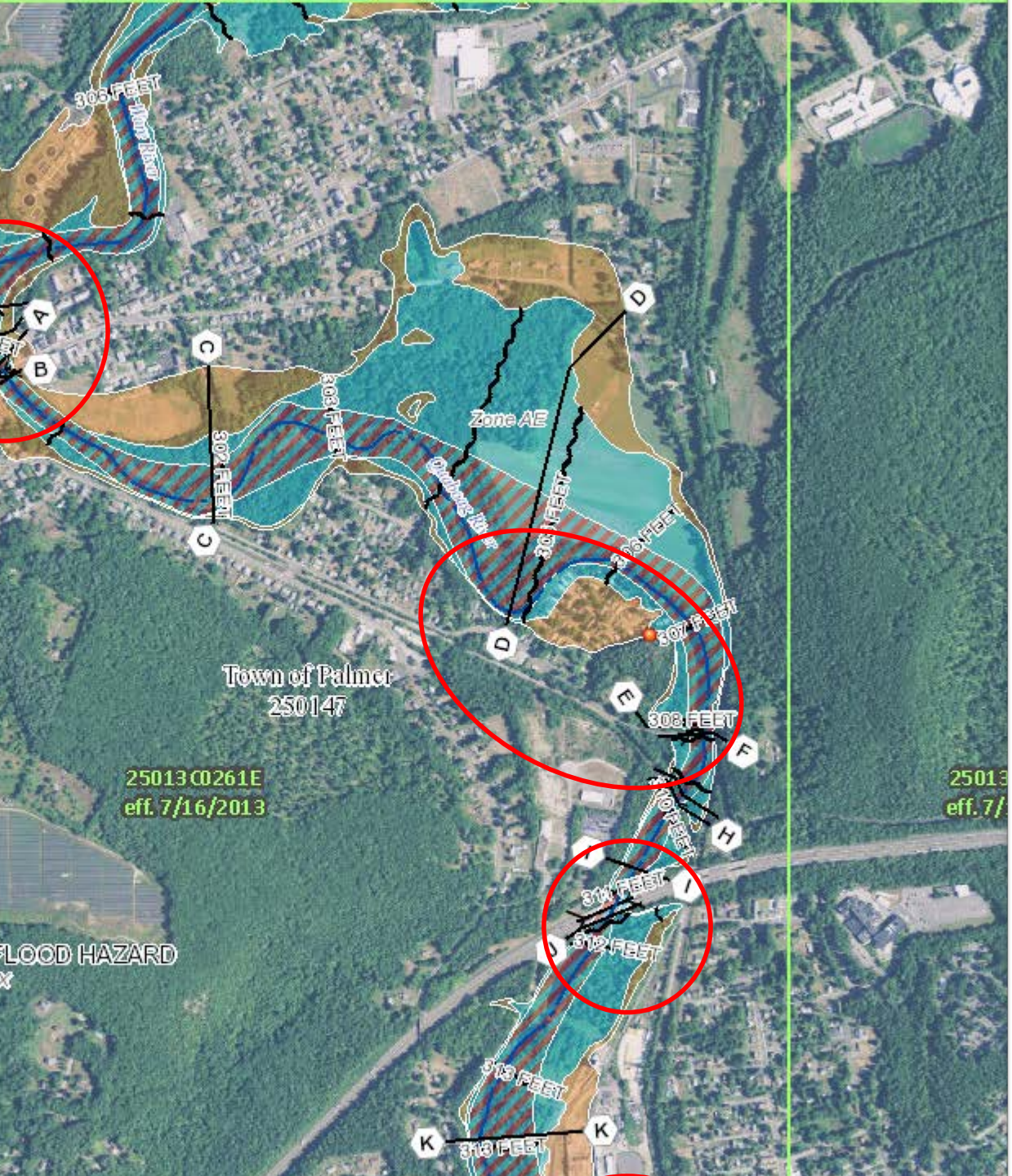
- Annual ↑ 1.51 days by 2050
- Greatest ↑ in spring and winter

Impacts

- Water quality
- Flood risk
- Erosion
- Stormwater infrastructure

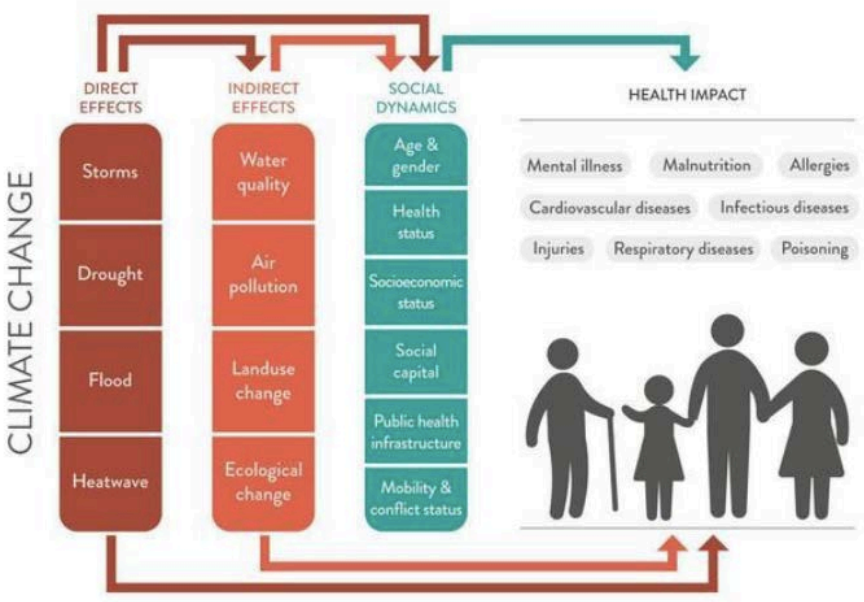
Extreme Precipitation > 1" (Projected)

		Chicopee Basin			
		Projected change in # Days with precipitation > 1"			
Season	Baseline (days)	2030s	2050s	2070s	2090s
Annual	6.46	+0.83	+1.51	+1.84	+1.73
Fall	2.04	+0.3	+0.42	+0.4	+0.26
Spring	1.39	+0.14	+0.33	+0.53	+0.57
Summer	1.9	+0.24	+0.34	+0.28	+0.28
Winter	1.11	+0.24	+0.41	+0.69	+0.82


303 FEET
Zone AE
308 FEET
307 FEET
Town of Palmer
250147
25013C0261E
eff. 7/16/2013
FLOOD HAZARD
314 FEET
312 FEET
313 FEET
A
B
C
D
E
F
H
I
K

Who and what is especially vulnerable?

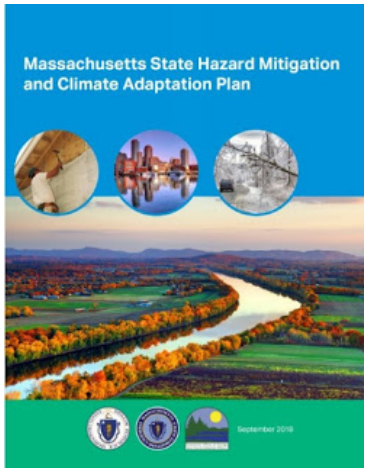
- Challenges
  - More extreme storm events/precipitation
  - More and longer heat waves
  - More summer drought
- Vulnerable populations
  - Under 5 and over 65 years old
  - Low income
  - Disabled and chronic illness
  - Limited English speakers
  - Socially or physically isolated
  - Agricultural community



- Other vulnerable assets – transportation infrastructure/culverts, drinking water, forests, biodiversity

Taking Action

Climate Action and Clean Energy Plan (2014)
A plan to guide actions in response to climate-change and its impacts. Offers strategies for local and regional actors to reduce GHG emissions and protect communities from climate-related damage.



Massachusetts State Hazard Mitigation & Climate Adaptation Plan (2018)
Comprehensively integrates climate change impacts and adaptation strategies with hazard mitigation planning.

Deerfield River Watershed Climate Change Vulnerability Assessment Pilot Project (2018)
Develops protocols for assessing the present and future extreme flood vulnerability of culverts to be incorporated as part of decision making process

MVP and Nature-Based Solutions

- The sustainable management and use of nature for tackling challenges such as climate change, water and food security, biodiversity protection, human health, and disaster risk management.
- Provides co-benefits for people and nature
- Examples
  - Prescribed fire to reduce forest fire risk
  - Bioengineered streambanks to secure from erosion
  - Flood and fish friendly culverts

Risk Matrix Exercise

Community Resilience Building Risk Matrix
Municipal Vulnerability Preparedness

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

Features	Location	Ownership	V or S	Top Priority Hazards (Extreme temperatures, drought, flooding, severe winter weather, severe storms, high winds)				Priority	Time
				Severe Winter Weather	Flooding	Extreme Temperatures	Drought	H-M-L	Short Long Ongoing
INFRASTRUCTURE				**COMMUNITY ACTIONS**					
EXAMPLE 1: Emergency vehicle access on public and private roads.	Town-wide	Town/State	V	As roads are upgraded, use designs that lessen ice buildup and make snow removal easier. Develop and implement pre-storm communication program, with specif focus on residents who may become isolated due to blocked or damaged road segments.					
EXAMPLE 2: Dirt roads suceptible to washout	Town-wide	Town/State	V		Explore feasibility of paving dirt roads that constantly wash out.				
SOCIETAL				**COMMUNITY ACTIONS**					
EXAMPLE 1: Emergency Shelter	Town Center	Town. Emergency Management	S/V	Identify and stock a primary shelter to operate as more than just a warming/cooling station. Develop a list of list of volunteers and resources that can be called upon if shelter is activated.					
EXAMPLE 2: Neighborhood cooperation	Town-wide	N/A	V	Assist associations in identifying and conducting best practices to reduce risk. Advance a neighbor helping neighbor" program through community center training.					
EXAMPLE 3: Residents with limited mobility or other functional needs	Town-wide	N/A	V	Create and maintain a list of home-bound residents for emergency management rescue and safety activities.					
ENVIRONMENT				**COMMUNITY ACTIONS**					
EXAMPLE 1: Drinking water resources/ground water/aquifer	Multiple/ Town-wide	State - Town - Private	S/V		Adopt regulations to ensure use of low impact development techniques to preserve the quality of stormwater runoff and reduce pollutant infiltration into drinking water.		Conduct Drinking Water Vulnerability Assessment Explore opportunities for deepening existing wells that ran dry during last drought.		
EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V		Adopt regulations that limit slope development and tree removal.				

Risk Matrix Exercise

Top Hazards for Palmer:
1. Severe Winter Weather
2. Severe Storms and Hurricanes
3. Flooding
4. Extreme Heat

Community Resilience Building Risk Matrix
Municipal Vulnerability Preparedness

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

Top Priority Hazards
(Extreme temperatures, drought, flooding, severe winter weather, severe storms, high winds)

Features	Location	Ownership	V or S	Severe Winter Weather	Flooding	Extreme Temperatures	Drought	Priority H-M-L	Time Short Long Ongoing
INFRASTRUCTURE				**COMMUNITY ACTIONS**					
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EXAMPLE 2: Dirt roads suceptible to washout	Town-wide	Town/State	V		Explore feasibility of paving dirt roads that constantly wash out.			M	O
SOCIETAL				**COMMUNITY ACTIONS**					
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EXAMPLE 2: Neighborhood cooperation	Town-wide	N/A	V	Assist associations in identifying and conducting best practices to reduce risk. Advance a neighbor helping neighbor" program through community center training.				M	S
EXAMPLE 3: Residents with limited mobility or other functional needs	Town-wide	N/A	V	Create and maintain a list of home-bound residents for emergency management rescue and safety activities.				H	S
ENVIRONMENT				**COMMUNITY ACTIONS**					
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EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V		Adopt regulations that limit slope development and tree removal.			M	S

Risk Matrix Exercise

Community Resilience Building Risk Matrix
Municipal Vulnerability Preparedness

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

Features	Location	Ownership	V or S	Top Priority Hazards (Extreme temperatures, drought, flooding, severe winter weather, severe storms, high winds)				Priority	Time
				Severe Winter Weather	Flooding	Extreme Temperatures	Drought	H - M - L	Short Long Ongoing
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EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V		Adopt regulations that limit slope development and tree removal.			M	S

After Risk Matrices are Complete…

- Turn in Priority Cards
- Report Outs
- Dot Voting

- Implementation Exercise and Report Outs

unicipal ulnerability reparedness
ction mplementation esign

	Lead Agency/ Department for Implementation	Partners	Cost	Funding Sources	Implementation Milestones
COMMUNITY ACTIONS	Examples: Emergency Manager, Select Board, DPW, Fire Chief, Community Preservation Act Committee, Finance Committee, Planning Board, etc.	Examples: Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.	Low: < $50,000 Medium: $50,000 – $100,000 High: > $100,000	Examples: Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.	Examples: 1. Create and convene a committee to oversee progress; 2. Dissiminate 300 information packets to raise awareness about the initiative; 3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

Data and maps available during workshop

- Resources for today
  - Maps
    - Basemap – for mapping exersize
    - Critical Facilities and (Past) Hazard Area Map
    - Surficial geology
    - Soils
    - Forest cover
  - Downscaled climate projections (on computer)
  - 2016 HMP

Any Questions?

APPENDIX E: PUBLIC LISTENING SESSION

AGENDA

NOTES

SIGN-IN SHEET