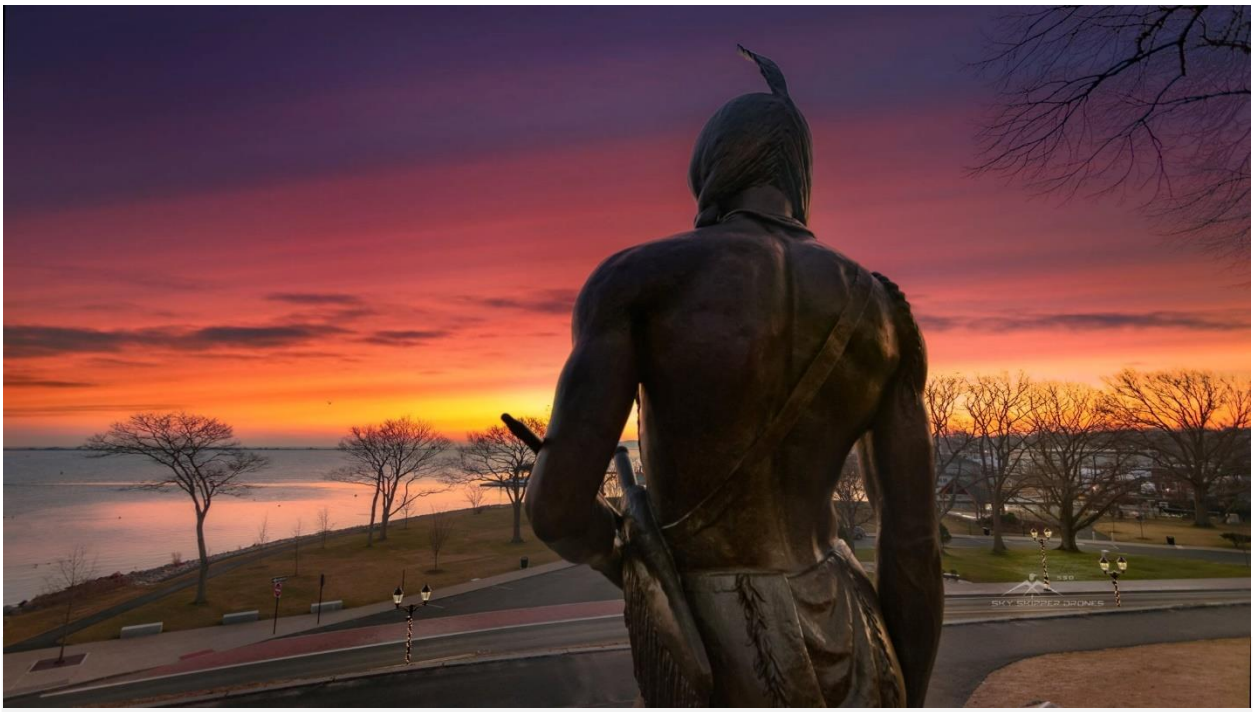

Image Source: Sky Skipper Drones

Town of Plymouth
Community Resilience Building Workshop
Summary of Findings
May 2020

OVERVIEW

In the last five years, Massachusetts has experienced increasingly more frequent and severe weather events. Record-breaking snowfall in 2015, a wide-spread 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. Additionally, Massachusetts in 2018 saw the most precipitation ever recorded since1890, according to the Blue Hills Weather Station. Climate Change is not imminent but affecting the people and cities and towns of the Commonwealth today, particularly those in coastal communities like the Plymouth.

Plymouth contains a rich fabric of cultural and natural assets and is internationally renowned for its history as "America's Hometown" and the First Thanksgiving Feast. It is one of the oldest municipalities in New England and the United States covering 134 square miles, 37 miles of coastline and 450 ponds. Plymouth is home to one of the largest contiguous tracts of the globally rare Atlantic Coastal Pine Barren forest and contains some of the most endangered species in Massachusetts. The Town through time has had the foresight to protect and promote these assets to uphold its cultural character and healthy, livable community.

In 2017, The Commonwealth of Massachusetts inaugurated the Municipal Vulnerability Preparedness (MVP) program to assist municipalities in planning for and implementing strategies to adapt to predicted changes in our warming climate. The Town of Plymouth, seeking to be proactive in addressing future climate threats, applied for a state planning grant through the MVP program to complete a climate and health vulnerability assessment and the Community Resilience Building (CRB) Workshop. Upon completion of the projects, the Town of Plymouth will be eligible to apply for MVP action grants to address natural hazards and climate risks.

The assessment that accompanies this report of the CRB Workshop, *Climate-Ready, Healthy Plymouth,* analyzes past and projected climate change hazards through the lens of the Social Determinants of Health and evaluates the implications of those hazards on Plymouth's infrastructure, environment, and society, including opportunities to improve health outcomes.

Photo Credit: Wicked Local/Emily Clark

The Town of Plymouth partnered with the Metropolitan Area Planning Council (MAPC) and the Old Colony Planning Council to complete the assessment and workshop. These projects were guided by a highly engaged Core Team consisting of municipal staff, representatives from various board and community institution, and a team of dedicated volunteers. Importantly, *Climate-Ready Healthy Plymouth* and the Workshop outcomes reflect the expertise of Plymouth residents, businesses, civic groups, and institutions recorded through a series of public engagement events, including two public forums and five focus groups.

Virtual Community Resilience Building Workshop

In April 2020, MAPC launched the virtual Community Resilience Building (CRB) Workshop. The workshop is a critical step to achieving MVP designation and is intended to gather information from representatives across diverse segments of the public on Plymouth's climate strengths, vulnerabilities, and potential resilience actions. These forums typically bring representatives together from across businesses, education, housing, social services, emergency preparedness, environmental stewardship, etc.

The Core Team identified and recruited community stakeholders to participate in a one-day in-person CRB Workshop. However, physical distancing guidelines established to protect the public from COVID-19 required MAPC and the Town of Plymouth to redesign a new workshop approach. Plymouth's CRB Workshop represented the first time this forum has been conducted entirely online. The Core Team once again helped promote Workshop engagement. Sixteen (16) people responded to the survey.

The Workshop's central objectives were to:

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

MAPC developed a web-page for the virtual Workshop and used videos, printable materials, virtual office hours, and a survey to facilitate online engagement and data collection. Materials provided for the workshop included local and regional data for changes in temperature, precipitation, and sea level recorded to date, as well as future projections to the end of the century. Posters provided data and mapping specific to Plymouth infrastructure, demographics, public health, and natural resources (see Appendix A).

The project team held a Virtual Forum (i.e. Listening Session) in May 2020 to share findings from the Climate-Ready Healthy Plymouth engagement forums and CRB Workshop and to engage the public in prioritization of resilience actions. This last virtual forum had the participation of forty-one (41) attendees.

SUMMARY OF FINDINGS

Top Hazards and Vulnerable Areas

Based on review of workshop materials, the Core Planning Team identified extreme heat, inland flooding, sea level rise, coastal erosion, severe storms (wind, snow, ice), and drought/wildfire as the climate hazards of greatest concern facing Plymouth. Inland flooding, coastal erosion, and severe storms have all affected Plymouth in recent years. The concentration of heat islands in parts of town with greatest indicators of social vulnerability also led to the selection of extreme heat as a hazard of key concern. The team also identified drought and wildfire as combined hazards, given the Town's history with wildfire and large tracts of forest.

Top Hazards

- Extreme Heat
- Inland flooding
- Coastal Erosion/SLR
- Severe Storms (wind, snow, ice)
- Drought/Wildfire

Current Concerns and Challenges Presented By Hazards

Participants noted increasing intensity of storms, including heavy rain events and wind, extensive erosion and damage to coastal infrastructure, and risks associated with rising temperatures. The principal threats from storms are power outages, most frequently due to damage from falling trees, and direct damage to coastal homes and infrastructure. Storm surge and large rain events result in flooding to coastal roads (especially at high tide), as well as when local streams and ponds exceed their banks. Participants also expressed concerns from rain event driven runoff polluting local water resources. Rising temperatures are associated with many cascading effects; they promote the growth of invasive species and disease vectors that harm both human and forest health. Combined with and independent of drought, rising temperatures raise the risk of wildfires, especially in the context of disease-weakened forests. Warming water temperatures promote the growth of bacteria in local ponds, valued for their ecological, aesthetic, and recreational benefits. Participants also expressed concern for residents in urban heat islands, outdoor workers, older adults and isolated individuals, who are perceived as more vulnerable to extreme heat events. As these issues are not new, the Town of Plymouth has taken significant steps to address these threats, particularly through its shoreline protection and restoration work done in partnership with local stewardship organizations. Workshop participants shared concerns that climate projections will heighten current challenges, particularly coastal erosion, heat, insect vectors, and impacts on water quality and supply.

Specific Categories of Concerns And Challenges

Infrastructure

Power outages compromise operation of critical facilities. Plymouth residents report a high frequency of power outages that they attribute to damage to above-ground power lines driven by a combination of poor forest health and heavy precipitation and wind events. Workshop participants expressed concern about these outages could threatened interruptions in the operation of critical infrastructure, such as fire stations, wastewater treatment plans, and wells. Outages also endanger older adults living in senior care facilities and people dependent on power to refrigerate medications or power medical devices.

Coastal erosion, storms, and flooding repeatedly damage coastal roads and homes. Many workshop participants expressed concern about the frequency and long-term implications of damage to coastal infrastructure. There is an implied sense of fatigue with the recurring costs associated with replacing or repairing coastal infrastructure that will become increasing susceptible to climate-related damage (e.g. Taylor Avenue and Warren Avenue). Participants also described increased development and home renovations along the coastline as vulnerabilities to continued erosion and coastal storms. Related but less frequently expressed concerns included, poor road conditions, inland flooding (e.g. Sacrifice Rock), septic system flooding (e.g. Whitehorse Beach), and the negative effect of narrow roads and dispersed forest development patterns on emergency response.

The Former Pilgrim Nuclear Plant poses a long-term risk of exposure to toxic waste. Several participants described safe long-term storage of spent fuel rods as a significant concern, particularly referencing their vulnerability to sea level rise.

Impervious surface is expanding with new development, even as it contributes to heat islands and water pollution. Workshop participants concerns over recent development is related to concern over the impacts of more impervious surface, which exacerbates water quality and heat island concerns.

Public Health and Society

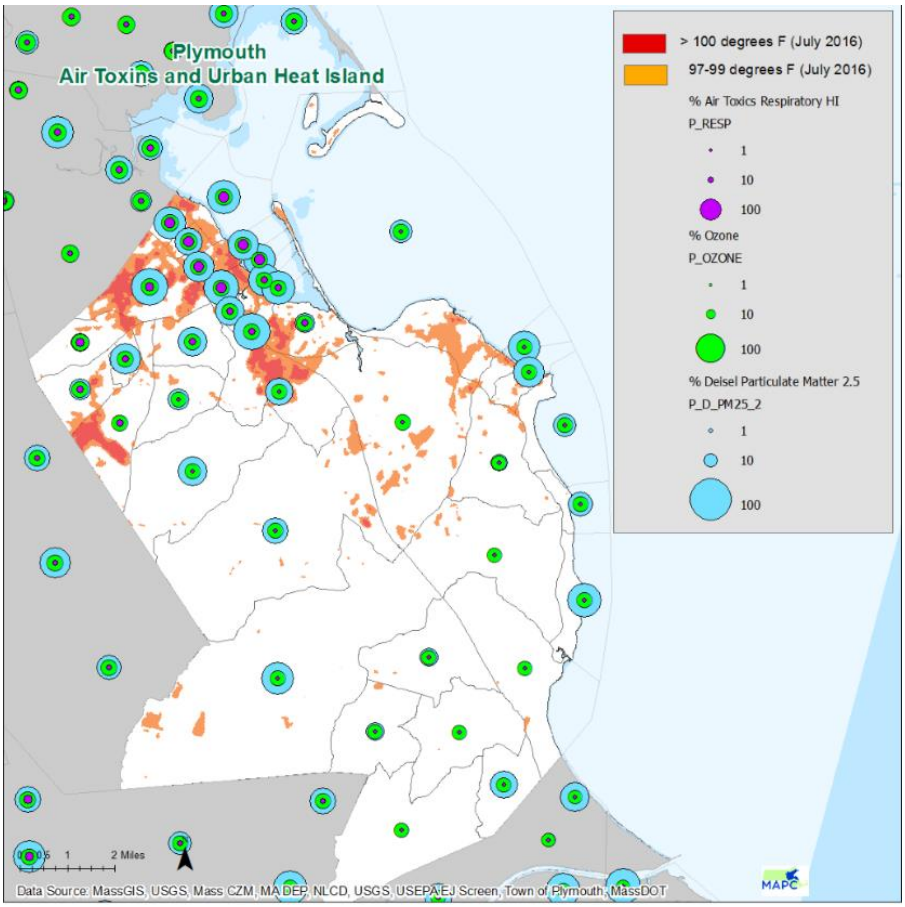

Figure 1. CRB Workshop participants described the disproportionate impact of heat islands on residents living in North Plymouth, Plymouth Center, and areas surrounding West Plymouth shopping centers. July 2016 temperature data is consistent with their description.

Rising temperatures drive exposure to extreme heat and disease vectors. Workshop participants expressed concern for the disproportionate impact that extreme heat poses for outdoor workers, people living in urban heat islands, and low-income households and (especially isolated) older adults without air conditioning. Loss of tree canopy and the cooling effect it provides emerged as a related concern. Participants also attributed the growing threat of tick- and mosquito-born illnesses, such as Lyme Disease and EEE, to rising temperatures, especially milder winters.

Aging, isolation, and poor transportation access increase vulnerability to emergencies. Social isolation is more frequently experienced by older adults and people living alone contributing to difficulties communicating during emergencies. Poor transportation access and mobility impairments (also more common among older adults) compromise households' ability to evacuate. One participant cited adequate police and EMT staffing for emergencies as a related vulnerability.

Public health and healthcare systems need additional capacity and support to proactively respond to growing climate-related health threats. CRB Workshop participants more frequently expressed this concern than participants in earlier public engagement activities. Some of the responses provide support for the idea that the Town and public's response to the pandemic influenced these concerns. Despite expressing confidence in the Board of Health and Department's

interest in and support for climate action, participants shared concerns over leadership support for the Board's work and for the lack of sufficient resources and expertise within the Department to monitor climate-related health threats and enforce regulations. Participants also expressed related concerns over the hospital system's capacity to meet changing needs, and adequate police and EMT staffing to respond to emergencies.

Socioeconomic inequities contribute to Plymouth residents' climate vulnerability. Consistent with the projects' framing of climate change within the social determinants of health, Workshop participants identified several socioeconomic factors that contribute to greater vulnerability of certain Plymouth residents to climate change. These factors included, such as poverty, community-level income disparities, employment insecurity, lack of access to transportation, lack of affordable housing, homelessness, and substance use disorder.

Environment

The loss and fragmentation of (primarily forest) habitat is especially concerning. Participants mostly point to the rapid and sprawling pattern of development as the primary contributor to loss of habitat, but storms, erosion, warming temperatures, and invasive plant and pest species also contribute to habitat loss, as does clearing of forest for solar farm installations. Participants are concerned about losing many of the co-benefits provided by these natural areas, such as cooling effect, shade, carbon sequestration, erosion control, water retention and filtration, wildlife habitat, recreation, and aesthetic character.

Existing threats to water quality will be exacerbated by climate change. Participants most frequently identified runoff from impervious surfaces, excessive use of fertilizers and pesticides, overflow from poorly maintained residential wastewater systems, plastic pollution, and pet waste as threats to water quality. Rising temperatures worsen these impacts by further promoting the growth of harmful bacteria. Salt water intrusion associated with sea level rise could also impair groundwater sources. In a related concern, participants identified groundwater overdraft associated with landscaping and agriculture as long-term threats to drinking water supply.

The coast is experiencing extensive erosion, damaging beaches and coastal bluffs. This was articulated as a broad concern by many participants, but one specifically suggested that barrier beaches like Plymouth Beach and Saquish will be severely impacted and possibly lost with rising sea levels along with protections they provide to inner shorelines. Coastal storms and sea level rise are described as two contributing factors to erosion.

Current Strengths and Assets

Workshop participants identified numerous Plymouth strengths and assets that will support resilience to future climate impacts. As shown below, participants identified many Town strengths across infrastructure, society and public health, and environment.

Broadly

There is support among state and local government for action on climate change.

- Proactive, climate-change-ready stance being taken by Commonwealth of MA
- Wide recognition by MA cities and towns that infrastructure will come under intense pressure from climate change and rising sea level
- Elected officials who accept that climate change is real
- Town Officials - communicate among one another

Infrastructure

The town has made efforts to advance renewable energy and energy efficiency.

- There have been some efforts to have renewable energy sources in town (solar), so more of these projects could be fostered.
- Large number of solar panels installations are reducing fossil energy usage
- Community Emergency Response Facilities - new fire department headquarters, new Harbormaster facilities
- advocacy of energy efficient buildings & non-fossil fuel energy sources (wind & solar)
- some attempt to move to solar.

Town Facilities such as fire stations, schools, roads, sewer infrastructure, and the harbor have recently been upgraded and/or are located in places less exposed to significant climate impacts.

- The harbor has a well-maintained jetty so hopefully offers protection from storms of increasing severity.
- Most town buildings and emergency response facilities are outside of flood zones
- Town properties sited on safe areas.
- Most roads built well to handle current weather conditions.
- Sewer - recently replaced to maintain safe disposal of sewage
- Stevens Park remediation and adaptation
- Water Master Plan in formation
- Dams
- Town Hall
- Several Schools
- Town buildings- built with severe weather reinforcements
- Bridges- built with severe weather, such as high winds, in mind
- Wells- provide clean water to townspeople
- better quality of municipal building recently, as opposed to the crappy buildings put up in the 1960's to 1990's
- good re-use of venerable old school buildings, like the Mt Pleasant St school
- Some attempt to refit and save town buildings.
- good attempt at repairing damaged roads.
- Plymouth's municipal buildings are sited well and should be OK.
- Town infrastructure is mostly adequate at present
- Improvements to the waterfront

- Buried power lines in new developments
- Fairly well-maintained roads
- Plymouth's sewage treatment plant is under capacity so there is room to increase the percentage of Plymouth that is sewered

The Pilgrim Nuclear Plan has recently been shut down.

- Shutdown of Pilgrim plant has reduced - but not eliminated - risk of catastrophic nuclear accident
- Pilgrim Nuclear Power Plant is shutting down

Society and Public Health

Recreational assets provide residents with active living and passive enjoyment opportunities.

- Parks/open spaces where citizens can spend more time outdoors
- Numerous parks and protected lands provide areas for exercise and scenery helping with mental health.
- Plymouth has a preserved many open spaces for recreational opportunities. These need to be promoted more for both residents and visitors.
- lots of open space, many walking trail systems, 2 bike trails to encourage outdoor exercise
- At least two skateboard parks and ADA accessible pathways for special populations to socialize & exercise
- plenty of green space

Plymouth has good public health systems specifically a strong healthcare system, high rates of insurance coverage, and local public health leadership that cares about climate change.

- A good public health system and near-universal health care coverage in MA.
- Forward-thinking elected officials.
- Engaged Board of Health and Director of Public Health
- Town Officials - communicate among one another
- Health Education/School Nurses - present in K-12 schools
- A good health care system with a leading regional hospital.
- Hospital in Community
- A public health department and Board of Health concerned with social determinants of health
- Medical facility- BID is prepared to handle severe emergencies that may occur due to climate change
- Health Board and Health Dept.
- Birgitta Kuehn has assembled an excellent Board of Health in Plymouth
- Plymouth has a hospital with an affiliation with Beth Israel Deaconess in Boston

Plymouth boasts and engaged community and strong community institutions that work collectively to address community needs.

- Town already has senior center and task force to end homelessness so these could be bolstered to protect vulnerable populations.
- Strong community spirit
- BID Plymouth is expanding and upgrading services
- A well-educated, science-based population.
- Strong Community Involvement
- Faith and Civic Groups Engaged and Active
- Though underutilized, a senior population with diverse and wide ranging social, educational and economic capacities, skills, interests and networks (social and cultural capital)
- An increasingly climate literate and engaged youth population (needing additional educational and social support)
- Community- checking in on elderly neighbors, low income friends, etc can help during tough times
- Religious organizations- offering food and assistance during emergencies
- Plymouth appears to be drawing people of higher income level

Other public health and society strengths:

- Good air quality
- Program of Studies - at each high school, courses on environmental education and the ocean are open to all students
- Many good opportunities for activities of all sorts with an abundance of restaurants, museums and historical places to visit and a strong arts scene and strong senior program.
- numerous farmers' markets
- Fairly independent economy
- diversity of lifestyles

Environment

Natural Resources provide many co-benefits including wildlife habitat, recreational opportunities, cooling, and protection from floods and erosion.

- The amount of land dedicated to forests aids in carbon sequestration
- Expansive coastal shorelines help to control erosion
- The number of trees that, at least in certain areas, are incorporated into the design development helps to abate urban heat islands
- Wetlands buffer surrounding land from flooding
- Forested areas provide shade and keep areas cooler
- Town forest well managed to reduce risk of fires during droughts
- Forest cover provides cooling, allows for more percolation into the aquifer, decrease erosion, stores carbon.
- The Plymouth-Carver aquifer will help provide year-round water despite droughts if properly managed and not overstressed by too many wells and too much withdrawal.

- Considerable tree canopy & open space
- Abundant clean drinking water
- Inner shoreline currently safe except for flooding in extreme storms and full moon tides.
- Ocean Coastline - more moderate temperatures, less extremes
- Pine Barrens/Natural Forests - provides biodiversity and gas exchange
- Vast Watershed - maintains safe levels of drinking water
- Fisheries - dependency on these for food/economy
- A significant aquifer that is an excellent water source.
- Much of the town has good tree cover and forests to trap co2 gases, improve water quality, and get temperatures more moderate.
- Our parks
- Trails
- Open Space
- Conservation land for recreation, biological diversity and habitats, ecosystem services
- Green and blue spaces for cooling temps, community uses, and relaxation/aesthetics
- Clean water for drinking and pond use and healthful habitats
- Large amount of tree canopy- improves air quality by absorbing CO2
- State Park and other nature reserves- encourage exercise and some offer education on nature
- Parks (such as Brewster Gardens)- plants absorb CO2 and serves as a lovely home for ecosystems
- large forested areas, tree cover in settled areas
- lots of lowlands for absorbing flood water along waterways & coast
- temperature moderation by being in coastal environment
- Miles of wonderful coastline, barrier beach, estuaries.
- Hundreds of acres of forested land
- Large sole source aquifer.
- Wealth of forests
- Large, full, mostly clean Plymouth-Carver aquifer below with many ponds for recreation
- Salt water beaches provide excellent relaxation
- Highly productive bay for aquaculture
- large swaths of protected wild space (Miles Standish, etc)
- natural bogs and marshes

There is a culture of conservation and stewardship in Plymouth that promotes open space acquisitions, restoration projects, and outdoor recreation.

- Well-established network of environmental organizations and individuals with expertise in town
- Existing portfolio of open space acquisitions
- Plymouth people who care deeply about the environment

- Quite a lot of our unique pine barrens ecosystem is protected and in general residents support protecting our natural environment
- Town Brook dam removal and restoration
- Much protected conservation land with numerous ponds and forests

Top Recommendations to Improve Resilience

On May 26, 2020, MAPC facilitated a virtual public forum where participants were able to learn about and engage with findings from the climate and health vulnerability assessment and the combined findings from all of the community engagement activities, including the public forum, focus groups, and virtual CRB Workshop. Using online polling through Poll Everywhere, MAPC facilitated a voting exercise on the climate action most frequently recommended in public responses. Participants were asked to vote for their top two priorities from each action area.

Participants designated the following as their TOP PRIORITY ACTIONS:

Infrastructure

- **Promote Energy Efficiency and Renewable Power** *(45% of vote)* by securing Green Communities designation, supporting adoption of electric vehicles, reducing municipal energy use, encouraging residential and commercial energy efficiency, and facilitating solar power generation on roofs, parking lots, and farms.
- **Inspect and Upgrade Residential Wastewater Infrastructure** *(33% of vote)* by providing incentives and assistance to homeowners, so they can upgrade cesspools and septic system or connect to town sewer.

Society and Public Health

- **Increase Access to Recreation** *(33% of vote)* opportunities for residents in every neighborhood by improving existing facilities and expanding walking and bicycling paths so that people have safe, non-vehicle alternatives to access open space amenities
- **Prepare for Emergencies** *(24% of vote)* using an integrated preparedness and communications plan that leverages diverse media, social networks, and neighborhood response teams to prioritize the wellbeing of vulnerable residents

Environment

- **Conserve Natural Areas and Prevent Sprawl** *(47% of vote)* by encouraging adaptive reuse of older buildings, incentivizing cluster developments, and acquiring and permanently conserving properties in ecologically sensitive areas, especially along coastlines and wetlands.
- **Manage and Protect Water Resources** *(28% of vote)* through frequent water quality testing, water conservation measures, regulating sources of pollution (e.g. pesticide and fertilizer use), and by completing and implementing the Town's Water Master Plan.

Summary of Additional Workshop Recommendations (as presented for voting):

Infrastructure

- **Prevent Power Outages** to critical facilities during and following emergencies by burying power lines, equipping facilities with back-up generators, and developing micro-grid and energy storage systems.
- **Prevent Repeated Damage to Homes** by discouraging armoring practices that jeopardize neighbors' homes, regulating cottage conversions, and by gradually buying and removing homes at highest risk for coastal storms and erosion
- **Inspect and Upgrade Residential Wastewater Infrastructure** by providing incentives and assistance to homeowners, so they can upgrade cesspools and septic system or connect to town sewer.

Public Health

- **Enhance Health System Capacity** by hiring and training qualified public health staff, enhancing disease surveillance systems (e.g. heat-related illness, vector-born disease), supporting enforcement action by the Board of Health, and developing multi-platform climate health education and prevention campaigns
- **Promote Climate and Health Education** to both improve public health literacy and awareness of climate and health impacts, including to support individual-level actions (e.g. protection from vector-borne illness)
- **Help Residents Keep Cool** as temperatures get hotter by helping older adult and low-income households access home weatherization and energy efficient cooling, planting trees, installing shade structures, and reducing impervious surface in heat islands, and by deploying cooling and emergency shelters

Environment

- **Conserve Natural Areas and Prevent Sprawl** by encouraging adaptive reuse of older buildings, incentivizing cluster developments, and acquiring and permanently conserving properties in ecologically sensitive areas, especially along coastlines and wetlands.
- **Manage and Protect Water Resources** through frequent water quality testing, water conservation measures, regulating sources of pollution (e.g. pesticide and fertilizer use), and by completing and implementing the Town's Water Master Plan.

Table of all CRB Workshop action recommendation responses are provided below:

Category	Climate Action	Priority
Infrastructure	Conduct with private sector partners an assessment of water, power, communication and transportation facilities to determine what risks to compromise of their integrity exist today and under various climate-change scenarios.	H

Infrastructure	Ensure that spent fuel rods stored at the Pilgrim nuclear site are located above any conceivable high water mark, in robust, very-long-life containers, and monitored on a daily basis.	H
Infrastructure	Ensure that all vulnerable critical facilities have the capability of islanding in the event that power is not available from the grid.	H
Infrastructure	Develop and implement an energy resilience plan	H
Infrastructure	Slow down residential development so existing facilities and health care systems aren't overloaded.	H
Infrastructure	Practice managed retreat	H
Infrastructure	Bury power lines	H
Infrastructure	Transfer all public lighting to LED, including parking lots	H
Infrastructure	Shoreline Protection	H
Infrastructure	Protect the aquifer with a plan	H
Infrastructure	Review zoning changing - maybe require generators on senior housing	H
Infrastructure	Make sure that affordable homes have appropriate reinforcements against severe weather (strong foundations, back-up generators, etc)	H
Infrastructure	Increase alternative energy sources	H
Infrastructure	more "rain gardens" and fewer storm drains attached to sewers	H
Infrastructure	Work to improve sea walls and protect vulnerable shoreline areas with more vegetation and by building dunes. Maybe some homes can be saved by elevating them with stilts, as has been done in some other coastal towns.	H
Infrastructure	Aggressively badger Holtec and NRC to conduct a leakproof, environmentally friendly shutdown of the Pilgrim Nuclear Power Plant	H
Society and Public Health	Conduct a post-analysis of the current COVID-19 disaster when possible to determine what failures in the health care and social support systems existed and develop a plan to fully address these failures within five years.	H
Society and Public Health	Improve recreational access (e.g. more bike and walking trails).	H
Society and Public Health	Make a town-wide effort to educate people about the facts of climate change (too often people see it as a political issue rather than a science one).	H
Society and Public Health	Pass a resolution requiring Plymouth to get to net zero emissions by 2050, with intermediate goals along the way. This will improve air quality and public health.	H

Society and Public Health	Roll out a massive educational program so that residents understand that climate change is already adversely impacting everyone (some more than others,) and teach them about actions they can take personally to prevent the impacts from getting a whole lot worse. Implement programs like Solarize Mass https://www.masscec.com/solarize-mass-1 to help people install solar at the best price with approved contractors.	H
Society and Public Health	Establish a fully staffed public health office at Town Hall	H
Society and Public Health	Enhance/identify cooling centers for emergency shelters and provide free public drinking stations for heat extremes	H
Society and Public Health	Utilize social media and social networks for developing neighborhood-specific emergency response teams to address vulnerable residents at times of emergency; similarly for visitors and tourists in downtown and open space locations.	H
Society and Public Health	Educate the youth	H
Society and Public Health	add to existing sidewalks, foot paths and trails to encourage walking	H
Society and Public Health	Enforce the codes already in place.	H
Environment	Invest in wetland restoration projects.	H
Environment	Acquire land for conservation	H
Environment	Do a study of the aquifer and what amount of withdrawal can be sustained, then, cap development to help ensure sustainable water quantity use	H
Environment	Practice managed retreat from the coastal areas at highest risk for damage or destruction	H
Environment	Plant trees	H
Environment	Encourage more projects like Living Observatory and the return to responsible land use	H
Environment	Promote deployment of solar arrays in heat island/hot spots, particularly parking lots, and widespread residential and commercial installations (not clear cutting for solar farms)	H
Environment	Lessen construction to save trees and air quality	H
Environment	Biggest Hope: Buy, protect, restore and conserve all types of land, terrestrial, estuarine and coastal, as much as possible as soon as possible. Plant native trees and shrubs and restore natural ecosystems.	H

Environment	Hire more environmental wardens to actually enforce laws, public health regulations and building codes to reduce illegal dumping and illegal use of natural areas.	H
Environment	As sea levels rise, have plan to evacuate properties that are not longer livable and further protect other areas that are vulnerable. Is it possible to build and stablalize the dunes more as has been done along some beaches?	H
Environment	Continue to preserve areas around as many ponds and wetlands as possible and improve septic systems that polute our ponds and waterways.	H
Environment	Continue to preserve lands around current and future well sites and encourage more water conservation.	H
Environment	Control/manage growth by instituting overlay zoning districts where bylaws more rigorously control growth in sensitive environmental areas	H
Environment	increase restrictions on lawn fertilizer usage that contributes to algal blooms	H
Infrastructure	Collaborate with colleagues in other parts of the country that are experiencing similar issues (i.e. weather related issues that affect the power grid) to assist the Town in developing a meaningful plan forward.	
Infrastructure	Put critical power lines underground.	
Infrastructure	Assist elderly/low income to install efficient cooling/heating systems.	
Infrastructure	Identify areas likely to be impacted by sea level rise like White Horse Beach and have action plans in place for worst-case scenarios.	
Infrastructure	Override homeowners agreements that prohibit installation of roof-mounted solar panels or outdoor clotheslines	
Infrastructure	Bring every resource to bear to require Holtech (spelling?) to build the most durable possible fuel rod storage and site them well above a 7-foot sea level rise.	
Infrastructure	Fix unsafe fire stations, improve their energy efficiency (air source heat pumps?), and install solar panels with battery storage backup to ensure continuous power during emergencies	
Infrastructure	Proactively inspect residential septic systems to identify systems in danger of failure or vulnerable sea level rise, and develop incentives to help owners upgrade their systems or, ideally, connect to town sewers.	
Infrastructure	Make actions of landowners along the coastline more equitable; one owner's actions should not negatively affect those of their neighbors	

Infrastructure	Establish/maintain a facilities evaluation program to avoid complete construction projects and instead focus on fixing and repairing	
Infrastructure	Establish regulations for future building projects to lessen the impact on the environment: LEED certified, etc.	
Infrastructure	Conserve More Open Space	
Infrastructure	Bury More power lines	
Infrastructure	Develop local and public utility power production, community solar options, storage capacity, and EV charging stations	
Infrastructure	Integrated town-wide emergency preparedness plan and communication network/ICT	
Infrastructure	Protect and reinforce homes near the beach that are being affected by erosion	
Infrastructure	redesign poor streets and highway cloverleafs to minimize excessive pavement	
Infrastructure	any house or building on the shoreline that is destroyed by coastal storms should not be allowed to be rebuilt	
Infrastructure	bury electrical lines	
Infrastructure	Remove all abandoned structures along the coast and in the greater community.	
Infrastructure	Replace impervious roadways and parking lots with permeable surfaces where possible, even where the Town thinks it may not be possible.	
Infrastructure	Plymouth needs to plan for better accessibility (roads) for its emergency vehicles	
Infrastructure	Plymouth needs to develop a plan for its hospital so that it might be ready for new and different functions due to global warming	
Infrastructure	Schools need to be readied for warmer temperatures.	
Infrastructure	The Town needs to stop permitting developments that result in urban sprawl with ever more need for expanding roads, and encourage reuse of dilapidated and abandoned buildings where infrastructure is already in place.	
Infrastructure	The Town needs a plan for managed retreat to assist those residents who live in vulnerable areas and assistance for homeowners who cannot afford to upgrade their septic systems.	
Infrastructure	It seems to me that there has not been sufficient attention given to the vulnerabilities of coastal homes due to bluff erosion on the southern sections of the Plymouth Coast; some sort of program to gradually buy and remove vulnerable homes sees warranted	

Infrastructure	Take stronger steps to restrict new construction on vulnerable coastlines	
Infrastructure	make it easier for composting toilets to be installed in new construction to lower nitrogen leeching	
Society and Public Health	Work with the MA Dept. of Public Health and the local Board of Health Health Dept. to document the full range of health threat vectors that currently exist to Plymouth residents, including tick and mosquito-borne illnesses and infectious diseases and prepare educational materials specifically targeted at these threats. Should cover awareness, prevention and treatment.	
Society and Public Health	Consider setting up and maintaining a sample group of Plymouth residents whose health can be tracked over time, similar to but more wide-ranging than the Framingham Heart Study.	
Society and Public Health	Consider developing a matrix that establishes milestones for the Town to meet to ensure that drinking water as well as pond water is of the highest possible quality. Water testing is one component but the matrix should seek to address the root cause of the water quality issues.	
Society and Public Health	Provide educational forums and materials regarding the negative ramifications of using pesticides and other toxins.	
Society and Public Health	Help to ensure that vulnerable populations have access to outdoor activities.	
Society and Public Health	Intigrate an educational component in the public schools to heighten awareness at an early age of public health concerns.	
Society and Public Health	Educate people about public health principles in general and impacts of climate change specifically.	
Society and Public Health	Encourage safe outdoor recreation	
Society and Public Health	Create neighborhood parks so that every resident can walk to one	
Society and Public Health	Plant trees to mitigate identified heat islands; prevent building of additional heat islands -- require developers to preserve existing trees and plant new ones	
Society and Public Health	More shade trees and vegetation would make red spot areas more liveable. Better planning to prevent additional red spot heat islands.	
Society and Public Health	Increase water quality testing	
Society and Public Health	Use social media as a way to enhance communication and understanding	

Society and Public Health	Connect and promote more waking and bike paths	
Society and Public Health	Promote and support community gardens and local food distribution hub	
Society and Public Health	Start/increase organizations dedicated to assisting the elderly prepare for the future	
Society and Public Health	prevent further loss of agricultural land to development, encourage local small farms	
Society and Public Health	Hire the best health director the Town can find and let him or her do their job.	
Society and Public Health	Continue to improve public areas to encourage more use. We are blessed with an abundance of excellent conservation areas and ponds. Beach areas could certainly be improved.	
Society and Public Health	More programs for promoting outdoor activity. Wildlands Trust and Friends of Myles Standish State Forest are two organizations that are leading the way for hiking and nature related activities. Senior Center and Mass Audubon are two others. We need to encourage more family activities and youth activities in natural areas that have been preserved. Same for seniors. Not many towns have the conservation diversity that Plymouth has to offer.	
Society and Public Health	We need to try to offer more public gardens to people who don't have access to do so. With the increased number of large appartment compleses, over 55 communities, have the opportunity to grow fresh produce and have flower gardens.	
Society and Public Health	The Town needs to hire top level professionals and support strong regulations to protect the health of Plymouth residents.	
Society and Public Health	The town of Plymouth needs to recognize the importance of public health and begin to work with the Board of Health instead of against it.	
Society and Public Health	Plymouth should develop a water conservation program and an impervious surface reduction program	
Society and Public Health	take significant steps to improving water quality by restricting fertilizers	
Society and Public Health	Improve compassionate treatment towards addiction	
Environment	Create an environmental action task force of town officials and community environmental leaders to develop a five-year, strategic environmental plan. Report progress toward plan goals and objectives during [State of Environment Forum].	

Environment	Continue to acquire land for open space and recreational purposes, especially large parcel opportunities such as the 1500-acre property that buffers the now-closed Pilgrim nuclear plant.	
Environment	Convene an annual State of the Environment forum that captures progress on all environmental fronts, public and private, and sets long-term environmental goals for the Town of Plymouth.	
Environment	Ensure that development planning elevates the protection of natural resources, such as trees and forests that can aid in carbon sequestration.	
Environment	Acquire land in sensitive areas to decrease development of these areas (esp. coastal flooding).	
Environment	Adopt water conservation practices and place these in by-laws for new developments.	
Environment	Update leaky septic systems and cess pools.	
Environment	Thin forests either mechanically or using prescribed fire	
Environment	Update stormwater infrastructure to protect water quality	
Environment	Create incentives to build denser housing to reduce habitat loss from large single family developments	
Environment	Encourage residents--including homeowner associations that mandate grass and prohibit ground covers - to reduce turf in their yards and use drought tolerant native plants in landscaping.	
Environment	Ban use of neonicotinoids and limit other pesticides by residents, agriculture, and landscapers.	
Environment	Maintain a healthier forest to avoid fires and more potential damage	
Environment	Keep additional forest lands from being cut down to protect drinking water supplies	
Environment	Work with State and Federal Agencies on Coastal Erosion	
Environment	Continue to work on a master plan	
Environment	Strengthen conservation protections and increase open space areas	
Environment	Increased forest management with proactive wildfire planning approach	
Environment	Protect ponds from waste with laws	
Environment	protect existing wetlands, restore fresh & salt water marshes where possible	
Environment	The Town needs to stop clear cutting for development and conserve and restore large tracks of forest to make forests less vulnerable.	
Environment	Town needs to stop residents from fertilizing and stand up against agencies that constantly spray pesticides.	

Environment	Limit water drawdown. Protect natural ponds and waterways from depletion, limit water use by business and residents. Make cranberry growers pay a fair price for the water they use and pollute.	
Environment	Pine barrens are fire prone. Continue agressive fire prevention policies with forest thinning, controlled burns and preserving more land in the more fire sensitive areas as buffer zones.	
Environment	Plead for more planning money for watersheds to identify the source of pollution so that remediation steps might be known before climate change worsens and the aquifer beneath is endangered by the pollution above (ponds)	
Environment	The Plymouth Carver Aquifer is a treasure to Plymouth, but we do not have a good understanding of how its reliability and quality will change with changing runoff patterns that will come with climate change. I think that some sort of modelling program could help anticipate what measures will be needed to protect the aquifer.	
Environment	Remove the rest of the small dams	
Environment	increase restrictions on cranberry bog usage and inputs	

APPENDICES

Appendix A – Plymouth CRB Workshop Strength and Vulnerability Matrices

Survey ID	Features	Location	Ownership	V or S
Infrastructure				
1	Proactive, climate-change-ready stance being taken by Commonwealth of MA			S
1	Wide recognition by MA cities and towns that infrastructure will come under intense pressure from climate change and rising sea level			S
1	Elected officials who accept that climate change is real			S
1	Extensive exposure to climate change effects and damage in existing infrastructure of roads, bridges, and facilities, especially in coastal areas			V
1	Lack of funding for infrastructure projects designed to improve resilience			V
1	A bureaucratic regime that slows infrastructure projects and public grants unnecessarily			V
2	The increasing frequency of temperature fluxuations may be having a negative affect on the integrety of road surfaces. There seems to be more sizeable potholes and even after they are patched, many seem to reopen in a relatively short amount of time.While understanding that there is a cost to the town, there is also a cost to residents in terms of additional wear on vehicles.			V

2	Nursing home facilities may be in vulerable positions when there are power outages. Such outages can lead not only to possible displacement but also to a delay in personnel being able to provide needed care and services.			V
2	The increased frequency of weather events may be leaving energy facilities more vulnerable. Determining and implementing measures to increase infrastructure resiliency is imperative.			V
2	The storage of toxic/hazardous materials in Plymouth is a vulnerability partly due to the unknown.There may not be clear uncontroverted studies relative to the effects of increased temperatures and/or rising sea levels on such stored materials.			V
3	Roads erosion from flooding during storm surges			V
3	Power lines above-ground risk for intense storms, ice storms, etc. Many other places are putting critical wiring underground.			V
3	Nuclear power plant sea level rise, spent fuel stored on site			V
3	The harbor has a well maintained jetty so hopefully offers protection from storms of increasing severity.			S
3	There has been some efforts to have renewable energy sources in town (solar), so more of these projects could be fostered.			S
4	Septic systems at Whitehorse Beach and Bartlett Pond are vulnerable to storms and sea level rise, contaminating surface waters.	Whitehorse Beach, Bartlett Pond		V
4	Taylor Ave and Warren Ave. are already overwashed or flooded during storms and this will only happen more often	Taylor Ave., Warren Ave.		V
4	Power lines (above ground) are taken down by falling trees during storms			V
4	Most town buildings and emergency response facilities are outside of flood zones			S

4	Radioactive waste stored at Pilgrim Nuclear Power Plant	Pilgrim Plant		V
5	Road washout from torrential rains - eg, Sacrifice Rock in 2019	Sacrifice Rock		V
5	Buried power lines in new developments			S
5	More impervious surfaces from new roads and parking lots in new residential developments			V
5	Shutdown of Pilgrim plant has reduced - but not eliminated - risk of catastrophic nuclear accident	Pilgrim Plant	Holtech	S
5	Narrow, winding roads and low-density single family home developments make it harder for fire/EMTs to respond to emergencies			V
5	Large number of solar panels installations are reducing fossil energy usage			S
6	Community Emergency Response Facilities - new fire department headquarters, new Harbormaster facilities			S
6	Sewer - recently replaced to maintain safe disposal of sewage			S
6	Town Officials - communicate among one another			S
6	Delicate Watershed - maintains safe levels of drinking water that can be affected by swings in climate change			V
6	Older structures - those that exist along the coastline are more vulnerable in the wake of storm surge, etc.			V
7	Town properties sited on safe areas.			S
7	Most roads built well to handle current weather conditions.			S
7	Inner shoreline currently safe except for flooding in extreme storms and full moon tides.			S
7	Infrastructure needs better maintenance to prevent huge repair costs. (Plymouth South HS, Fire stations)	Plymouth South HS, Fire Stations		V
7	Safe long term storage of spent fuel rods is a huge concern. Where will we be 100 years from now?			V

7	With Plymouth's population aging, will there be enough facilities for 65+ people needing care and that are truly affordable for those wilth fixed incomes?			V
8	Town Brook dam removal and restoration	Town Brook		S
8	Stevens Park remediation and adaptation	Stephen's Park		S
8	Water Master Plan in formation			S
8	Nursing homes and affordable housing located in/near heat islands			V
8	Pilgrim nuke and SLR	Pilgrim Plant		V
8	High wind events downing power lines increasing fire risks and outages			V
9	Dams			S
9	Town Hall	Town hall		S
9	Several Schools			S
9	Road Flooding			V
9	Aquifer Capacity			V
9	Loss of Homes from Erosion			V
10	Roads- some of Plymouth's roads are susceptible to potholes, which can be dangerous. Pot holes can be caused by water freezing and expanding, which can be deterred with proper drainage systems			V
10	Town buildings- more construction means less nature which can lead to the collapse of ecosystems, increase in air pollution, etc			V
10	Beach side houses- vulnerable to erosion due to rising sea levels			V
10	Town buildings- built with severe weather reinforcements			S
10	Bridges- built with severe weather, such as high winds, in mind			S
10	Wells- provide clean water to townspeople			S

11	advocacy of energy efficient buildings & non-fossil fuel energy sources (wind & solar)			S
11	better quality of municipal building recently, as opposed to the crappy buildings put up in the 1960's to 1990's			S
11	good re-use of venerable old school buildings, like the Mt Pleasant St school	Mt. Pleasant Street School		S
11	large areas of impermeable hard top surfaces of streets,highways, driveways, parking lots			V
11	intensive building development along coast edges			V
11	lots of golf courses with excessive phosphate based fertilizer use and overuse of ground water			V
12	Some attempt to refit and save town buildings.			S
12	some attempt to move to solar.			S
12	Town continues to permit developments in locations vulnerable to sea level rise -- Cordage Park for example.			V
12	solar should NEVER be a reason to cut forestland or place on land suitable for human use.			V
12	good attempt at repairing damaged roads.			S
12	many of the roads along the shore wash out regularly and are under constant repair. Town needs to find permanent solutions to roads and bridges negatively impacted by climate events.			V
12	Plymouth's municipal buildings are sited well and should be OK.			S
14	Pilgrim Nuclear Power Plant is shutting down	Pilgrim Plant		S
14	The Pilgrim Nuclear Power Plant will be storing nuclear waste which may be vulnerable to rising sea levels	Pilgrim Plant		V

14	Plymouth's road system does not allow for quick enough emergency response time; this will only worsen as climate is warmer, more people live in Plymouth			V
14	Town infrastructure is mostly adequate at present			S
14	Hospitals will be taxed more severely as global warming increases			V
14	Schools may not be prepared for higher temperatures, shorter school years			V
16	Improvements to the waterfront			S
16	Easy access to highways			S
16	Fairly well maintained roads			S
16	low-lying homes along eroding coastlines			V
16	wastewater treatment plant on the edge of an aquaculture zone			V
16	significant costs to protect existing coastline from rising water			V
Society and Public Health				
1	A good public health system and near-universal health care coverage in MA.			S
1	A well-educated, science-based population.			S
1	Forward-thinking elected officials.			S
1	A warming environment that fosters the geographic spread of viruses and bacterial infections.			V
1	An aging population.			V
3	There are many agricultural workers that live/work in Plymouth and this is a very vulnerable population to increasing temperatures and other aspects of climate change.			V
3	Parks/open spaces where citizens can spend more time outdoors			S
3	Town already has senior center and task force to end homelessness so these could be bolstered to protect vulnerable populations.			S

4	Aging population			V
4	Tick and mosquito-borne disease on the rise			V
4	A certain percentage of the population does not understand public health (as evidenced by those not wearing masks or social distancing during the pandemic)			V
4	Good air quality			S
4	Strong community spirit			S
4	Engaged Board of Health and Director of Public Health			S
4	Numerous parks and protected lands provide areas for exercise and scenery helping with mental health.			S
5	Aging population in over-55 communities lack access to convenient public transit; forcing them to move when they can't drive anymore - ie, difficult to age in place			V
5	BID Plymouth is expanding and upgrading services			S
5	Extreme heat will reduce # of days when outdoor workers (roofers, landscapers, consruction) can safely work			V
5	Center for Active Living a valuable resource for seniors			S
5	Seniors and families without air conditioning will suffer in heat waves			V
6	Town Officials - communicate among one another			S
6	Health Education/School Nurses - present in K-12 schools			S
6	Public Health Department is not fully staffed with most qualified personnel			V
6	Program of Studies - at each high school, courses on environmental education and the ocean are open to all students			S
7	Plymouth has a preserved many open spaces for recreational opportunities. These need to be promoted more for both residents and visitors.			S

7	Many good opprtunities for activites of all sorts with an abundance of restaurants, museums and historical places to visit and a strong arts scene and strong senior program.			S
7	A good health care system with a leading regional hospital.			S
7	A strong opiod problem.			V
7	Hot spot areas need to be addressed. Exit 5 retail and future residential areas could be improved. Same for other areas with too much tar and cement and not enough greenery.			V
7	Air pollution and warmer climates will have a greater impact on health.			V
8	Hospital in Community			S
8	Strong Community Involvement			S
8	Faith and Civic Groups Engaged and Active			S
8	Homelessness			V
8	Need for enhanced transportation			V
8	Increased Mosquitoes and Ticks			V
9	A public health department and Board of Health concerned with social determinants of health			S
9	Though underutilized, a senior population with diverse and wide ranging social, educational and economic capacities, skills, interests and networks (social and cultural capital)			S
9	An increasingly climate literate and engaged youth population (needing additional educational and social support)			S
9	EJ populations in North and West Plymouth near/inside heat islands	North and West Plymouth		V
9	Upwards of 40% of households face a combination of asset limits, income constraints, and employment insecurity, compromising their abilities to respond to extreme events			V

9	Social isolation for many seniors, and physical mobility constraints across both age and abilities demographics			V
9	Extended heating seasons for increased tick and mosquito populations and disease risks			V
10	Low income- may not be able to afford housing with severe weather reinforcements, which could lead to disaster in a severe weather event			V
10	People living alone- may not be able to access communication during severe weather occurrences. This could lead to injuries or even death.			V
10	People with limited access to transportation- could have trouble finding transportation if the need to evacuate arises.			V
10	Community- checking in on elderly neighbors, low income friends, etc can help during tough times			S
10	Religious organizations- offering food and assistance during emergencies			S
10	Medical facility- BID is prepared to handle severe emergencies that may occur due to climate change			S
11	lots of open space, many walking trail systems, 2 bike trails to encourage outdoor exercise			S
11	at least two skateboard parks and ADA accessible pathways for special populations to socialize & exercise			S
11	numerous farmers' markets			S
11	longer heat waves will increase electricity usage for air conditioning, isolate people in their houses			V
11	invasive insects or overpopulation of native insects (ticks, mosquitos) that are disease vectors			V
11	heat stress or hypothermia for elders as a result of temperature extremes			V

12	EMT and police staff may be overwhelmed in a climate emergency. Town needs to retain adequate force in preparation for extreme weather and climate related emergencies.			V
12	Health Board and Health Dept.			S
12	Plymouth appears to be drawing people of higher income level.			S
14	Sense that the Plymouth Health Dept. is not proactive and does not have the leadership, force and level of expertise to monitor and enforce water, air quality, vector born diseases, garbage regulations and other threats to public health, especially as extreme weather events cause greater possibilities of pollutant release.			V
14	The influx of new residents with high levels of income are prompting developers to constantly clear new land for housing, while too many people live at or below the poverty line and can't find affordable housing.			V
	The Town is spending way too much money to protect the homes of the wealthier residents and keep roads to beach homes open.			V
14	Birgitta Kuehn has assembled an excellent Board of Health in Plymouth			S
14	Plymouth administration is not letting the Board of Health do their job; the necessity for working together will only increase with climate change -- see coronavirus as an example			V
14	Plymouth has a hospital with an affiliation with Beth Israel Deaconess in Boston			S
14	Changes may have to be made is size and emphasis to accommodate new waves of disease due to global warming			V
14	Plymouth's sewage treatment plant is under capacity so there is room to increase the percentage of Plymouth that is sewered			S

14	Increases in development will lead to increases in septic tanks, which, combined with temperature rise will increase pond and aquifer pollution			V
16	Fairly independent economy,			S
16	plenty of green space,			S
16	diversity of lifestyles			S
16	significant income disparity,			V
16	drug abuse and addiction,			V
16	mild winters lead to an increase in Lyme's disease			V
Environment				
1	Financial strain on public finances, limiting future investment in natural resources			V
1	Well-established network of environmental organizations and individuals with expertise in town			S
1	Extensive coastline subject to erosion under sea-level rise scenarios			V
1	Existing portfolio of open space acquisitions			S
1	Loss of focus on climate change and loss of traction in preparing for its likely consequences on local, state and national levels due to COVID-19			V
1	Plymouth people who care deeply about the environment			S
1	Chemical applications intended to stem "pest" infestations that have unintended consequences, e.g., neonicotinoid pesticides killing bees.			V
2	More development could pose a risk to our future water supplies and recreational areas.			
2	The amount of land dedicated to forests aids in carbon sequestration			S
2	Expansive coastal shorelines help to control erosion			S

2	The number of trees that, at least in certain areas, are incorporated into the design deveopment helps to abate urban heat islands			S
2	Since forests significantly aid in carbon sequestration, building decisions should consider the cost of carbon in determining what should be built and where it should be constructed. Such an examination may lead to planning more developments in previously disturbed areas.			V
2	The effect of sea-level rise on coastal groundwtater can contaminate wells and in-turn negatively impact drinking water. Clean water should be a basic right of every resident in Plymouth.			V
3	Coastline/beach erosion from sea level rise and intense storms			V
3	Extreme high and low water levels in ponds due to epic rain events and droughts			V
3	Agriculture droughts			V
3	Wetlands buffer surrounding land from flooding			S
3	Forested areas provide shade and keep areas cooler			S
	Recent increasing population and unchecked development has led to a loss of forest/open spaces. These spaces will be come increasing important to mitigate effects of climate change and should not be shrinking so quickly!			V
3	Town forest well managed to reduce risk of fires during droughts			S
4	Forest cover provides cooling, allows for more percolation into the aquifer, decrease erosion, stores carbon.			S
4	The Plymouth-Carver aquifer will help provide year-round water despite droughts if properly managed and not overstressed by too many wells and too much withdrawal.			S

4	Development, along with climate change, will further stress water quantity and quality, increase heat island effects, possibly site structures in flood zones, and decrease forest cover			V
4	Surface water temperatures will increase, diminishing quality of ponds and cold water fisheries.			V
4	Salt marshes at risk for degradation.			V
5	Considerable tree canopy & open space			S
5	Wildfire risk to homes built in or near woods, especially with summer droughts and dead trees from beetle infestation			V
5	Abundant clean drinking water			S
5	Increasing water use for underground sprinklers in new developments puts pressure on water supply in summer and uses valuable potable water on lawns			V
5	Runoff pollution in our ponds from lawns abutting ponds			V
5	Quite a lot of our unique pine barrens ecosystem is protected and in general residents support protecting our natural environment			S
6	Ocean Coastline - more moderate temperatures, less extremes			S
6	Pine Barrens/Natural Forests - provides biodiversity and gas exchange			
6	Vast Watershed - maintains safe levels of drinking water			S
6	Ocean Coastline - eroding away from natural storm surge, less protected by residential/commercial development			S
6	Fisheries - dependency on these for food/economy			
7	Much protected conservation land with numerous ponds and forests.			S
7	A significant aquifer that is an excellent water source.			S

7	Much of the town has good tree cover and forests to trap co2 gases, improve water quality, and get temperatures more moderate.			S
7	Shorelines prone to significantly more erosion and major property loss with severe storms and rising sea levels. Barrier beaches like Plymouth Beach and Saquish will be severly impacted and possibly lost with rising sea levels along with protections they provide to inner shorelines.	Plymouth Beach, Saquish		V
7	Droughts and warmer temperatures will fuels prospects for major fires in the pine barrens areas with significant property losses. (Major fires of 1900, 1957 amd 1964 occured when property density was consideralbly less. Many neighborhoods could be lost in what was once undeveloped forest)			V
8	Our parks			S
8	Trails			S
8	Open Space			S
8	Coastal Erosion			V
8	Sea Level Rise			V
8	Extreme Heat/Droughts			V
9	Conservation land for recreation, biological diversity and habitats, ecosystem services			S
9	Green and blue spaces for cooling temps, community uses, and relaxation/aesthetics			S
9	Clean water for drinking and pond use and healthful habitats			S
9	Extreme heat effects on habitats and increased wildfire risks			V
9	Drought periods degrading water quantity and quality, with compromised tree health and increased wildfire risks			V
10	Beaches- town that could suffer from severe erosion			V

10	Air- if 83% of Plymouthians drive independently to work, their cars are adding pollution to the atmosphere, decreasing the air quality			V
10	Large amount of tree canopy- improves air quality by absorbing CO2			S
10	Ponds- vulnerable to pollution which would impact drinking water			V
10	State Park and other nature reserves- encourage exercise and some offer education on nature			S
10	Parks (such as Brewster Gardens)- plants absorb CO2 and serves as a lovely home for ecosystems			S
11	large forested areas, tree cover in settled areas			S
11	lots of lowlands for absorbing flood water along waterways & coast			S
11	temperature moderation by being in coastal environment			S
11	ponds subject to fertilizer run-off from lawns and cranberry bogs			V
11	beaches and cliffs subject to storm erosion			V
11	urban forest - street trees - shrinking			V
12	Miles of wonderful coastline, barrier beach, estuaries.			S
12	Coastline, particularly Long Beach and Stephens Field contain structures that are already being damaged with every storm and even some high tides (Ryder Way flooded last full moon high tide May 5). The Town needs to allow natural forces to take place.	Long Beach, Stephen's Field, Ryder Way		V
12	Hundreds of acres of forested land			S
12	Some research indicates that pitch pine and oak forests are highly susceptible to climate changes and insect infestations, such as Southern Pine Beetle, which is moving northward. The Town needs to stop clear cutting for development and conserve and restore large tracks of forest to make forests less vulnerable.			V

12	sandy soils and high water table make ground water highly susceptible to contamination from many sources. Town needs to stop residents from fertilizing and stand up against agencies that constantly spray pesticides.			V
12	Large sole source aquifer.			S
14	Wealth of forests			S
14	Forests vulnerable to fast development without constant upgrades of long-range plans and by-laws			V
14	Large, full, mostly clean Plymouth-Carver aquifer below with many ponds for recreation			S
14	Aquifer is close to the surface and is sensitive to rapid development of Plymouth due to runoff, septic etc.			V
14	Salt water beaches provide excellent relaxation			S
14	Rising sea level could contaminate aquifer			V
14	Runoff remediation to control algae blooms and cyanobacteria blooms is not being pursued aggressively enough; storm severity increase with climate change will increase the number of runoff incidents			V
16	Highly productive bay for aquaculture			S
16	large swaths of protected wild space (Miles Standish, etc)			S
16	natural bogs and marshes			S
16	large (but shrinking!) number of deadbeat dams blocking native fish passage			V
16	cranberry bogs pumping chemicals into groundwater and shared waterways			V
16	algal blooms are becoming more problematic each year in Plymouth Bay due to a variety of inputs			V

Appendix B – Priority Actions Voting Results by Listening Session Participants