Photo credit: Sky Skipper Drones

Climate-Ready Healthy Plymouth

JUNE 2020 EXECUTIVE SUMMARY

Plymouth Massachusetts

Old Colony Planning Council

MAPC

Acknowledgements

The project was conducted by the Metropolitan Area Planning Council (MAPC) in partnership with Old Colony Planning Council. Funding was provided by the Commonwealth of Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness Planning Grant.

METROPOLITAN AREA PLANNING COUNCIL

Officers

President	Erin Wortman
Vice President	Adam Chapdelaine
Secretary	Sandra Hackman
Treasurer	Sam Seidel
Executive Director	Marc D. Draisen
Senior Environmental Planner	**Darci Schofield**
Public Health Planner II	**Jeanette Pantoja**

Town of Plymouth

Town Manager	Melissa Arrighi
Planning Director	Lee Hartmann

STEERING COMMITTEE MEMBERS

Lee Hartmann	Planning and Development
Laurie Muncy	Principal Planner, OCPC
Karen Keane	Public Health
Rich Vacca	Conservation
Jonathan Beder	Public Works
Henry Lipe	Emergency Management
David Gould	Marine and Environmental
Ken Tavares	Board of Selectmen
Birgitta Kuehn	Board of Health
Malcolm MacGregor	Planning Board
Gerre Hooker	Conservation Commission
Christopher Moore	Beth Israel Deaconess Hospital-Plymouth
Bill Keohan	Community Preservation
Dorie Stolley	Community Member
Judy Savage	Community Member
Evelyn Strawn	Community Member
Joanne Zygmunt	Senior Planner, OCPC

Contents

Introduction

The year 2020 marks the 400th Anniversary of the Mayflower voyage, the end of the "Great Dying" of the Wompanoag, and a new beginning with the establishment of the colony of Plymouth with the Pilgrims. The Pilgrims arrived on the Mayflower at the onset of winter and struggled through the hardship of bitter cold, snow and ice to establish themselves in the New World. The Wompanoag suffered a devasting plague and great loss of their Nation with the death of 10,000s of their people.[1] Nonetheless, the people of Plymouth, both colonists and Wompanoag, persisted creating a 400 year legacy that is being celebrated locally, nationally, and internationally in this commemorative year. As history comes full circle, with our changing climate and the COVID-19 global pandemic, *Climate-Ready Healthy Plymouth* in 2020 could not be more relevant. As Plymouth reflects and celebrates its cultural history over the last 400 years, *Climate-Ready Healthy Plymouth* looks to our future to protect the health, well-being, and vitality of Plymouth, its residents, businesses, and visitors in the face of our changing climate.

Climate change is one of the most compelling environmental, economic, and social issue of our generation. Plymouth contains a rich fabric of cultural and natural assets. It covers 134 square miles, 37 miles of coastline, 450 ponds and one of the largest contiguous tracts of the globally rare Atlantic Coastal Pine Barren forest. However, climate change hazards threatens these assets and the health of the Plymouth community. *Climate-Ready Healthy Plymouth* analyzes how past and projected climate change hazards affect Plymouth's Social Determinants of Health to evaluate the implications on Plymouth's infrastructure, environmental, and society and opportunities to adapt for better health outcomes. This project was funded by an expanded scope of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Planning Grant and completed in partnership with Old Colony Planning Council.

Fundamentals of climate change and public health

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. Climate Change is not imminent but affecting the people and cities and towns of the Commonwealth today. Climate change hazards evaluated in Climate-Ready Healthy Plymouth are summarized below.

[1] "OUR"STORY: 400 YEARS OF WAMPANOAG HISTORY. https://www.plymouth400inc.org/our-story-exhibit-wampanoag-history/

Climate Risk	1900-Present	2050	2100
Sea Level Rise	11" in Boston Harbor	≤4.2 feet	≤7.4 feet
Temperature	2° globally	~22 days over 90°	~50 days over 90°
Precipitation	>10% increase in Boston; 70% increase NE US	10 days with >1" Precipitation Events	1% Chance Storm becomes a 25% Chance Storm

There is agreement among public health experts that health outcomes are highly influenced by social, environmental, and behavioral conditions shaped by the context in which we live These conditions are collectively termed the social determinants of health. In Massachusetts, the MA Department of Public Health (DPH) groups social determinants of health into six categories: Built and Neighborhood Environment, Education, Employment, Housing, Safety and Community Cohesion.

	Transportation/streets
	Buildings/Infrastructure
	environmental exposure
	open spaces
	Formal education in schools
	Activities in community groups
	Informal Education
	Income
	Poverty
	Unemployment
	Rental/Own
	Homelessness
	Affordability
	Neighborhoods/access to parks
	Toxic Exposure
	Mental Health
	Domestic and Self Violence
	Collective (Large-scale conflict)
	Repression/Neglect
	Social Inequality
	Interpersonal
	Community
	Society

Social determinants of health are driven by policies and values established across social and economic systems. Systemic inequities result in an unequal distribution of poor health outcomes (i.e. health disparities).

Climate change affects health in numerous ways. Beyond direct impacts such as heat illness, exposure to flood waters, or injury during a storm, climate change affects the social and environmental conditions that contribute to poor long-term health outcomes, such as food insecurity, poor air and water quality, and displacement. When public health and climate change are considered together, strategies to minimize and adapt to climate change also provide tremendous public health benefits while ensuring resilient and healthy communities into the future. *Climate-Ready Healthy Plymouth* is therefore an effort to institute systemic change that promotes climate resilience and community health for generations to come. This effort is guided by the following fundamentals:

Why Climate Change and Health?

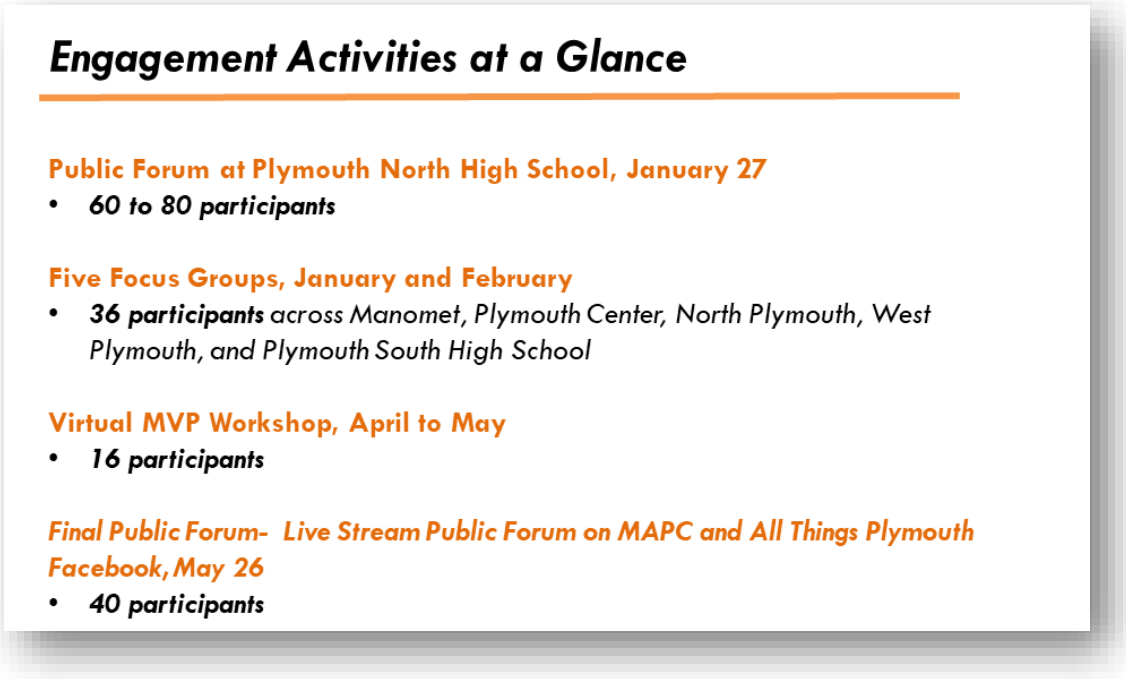
1. Humans have a right to the resources necessary for health.
2. People and their physical environment are interdependent.
3. Climate Change threatens the fundamentals that sustain life and health.
4. Everyone, everywhere is affected.
5. Health risk and impacts of climate change not equally distributed across people, communities, or nations.
6. Climate change exacerbates existing health inequities.

Source: Climate Change, Health, and Equity: A Guide for Local Health Departments. Pp. 2-4

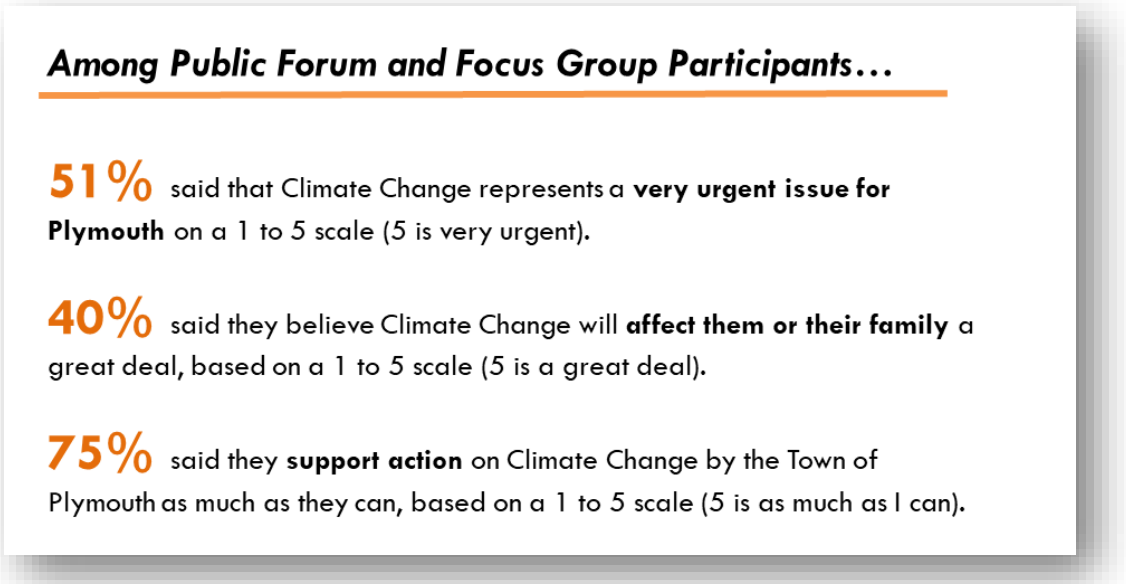
Public Engagement

Climate Ready Healthy Plymouth is part of a Commonwealth of Massachusetts Municipal Vulnerability Preparedness Planning grant program with an expanded scope. The expanded scope included doing a comprehensive climate and public health vulnerability assessment, coastal zone vulnerability matrix, and extennsive public outreach and engagement. The effort was guided by Plymouth's Planning Director and a 17-member multidisciplinary Core Team. Outreach

events for this planning effort include:



Residents of Plymouth are deeply concerned about climate change and are ready to further support actions for greater resilience. Participants engaged in a series of polling, survey, and interviews related to climate change, public health, and Plymouth's strengths and vulnerabilities in these categories.



Top Plymouth Vulnerabilities

- **Loss of Open Space and Natural Resources** mostly as a result of development, but exacerbated by storms, erosion, warming temperatures, and spread of invasive plant and pest species
- **Water Pollution** associated with runoff from impervious surface, excessive use of fertilizers and pesticides, plastic pollution, rising water temperatures, and poor maintenance of residential wastewater systems
- **Power Outages** which pose a threat to critical town facilities (e.g. wastewater and fire facilities) and to nursing home residents. Problem particularly attributed to above ground power lines and downed trees
- **Increasing Temperatures** that will disproportionately impact outdoor workers, people living in urban heat islands, and low-income households and older adults without AC

Top Plymouth Strengths

- **Natural and Recreational Resources** which support many co-benefits, including habitat, water quality protection and flood mitigation, cooling, active and passive recreation
- **Community Leadership and Institutions** strong support among state and local government for action on climate change, good healthcare system and social service organizations, culture of environmental stewardship and volunteer groups
- **Sense of Complete Community** that is generated by the Town's history, vibrant downtown, convenient location, and recreational amenities

Summary of Climate Change and Public Health Vulnerability Assessment

Neighborhood and Built Environment

Built environment is a critical social determinant of health that shapes the physical character of the places where we live, learn, work, travel, and play. The Neighborhood and Built Environment category includes infrastructure such as critical facilities, transportation, parks and open space, streets, utilities and the systems that connect them such as roads, bridges, parks, etc. Healthy, livable communities are ones that have minimal exposure to environmental and climate risks, well-maintained and highly functioning infrastructure, and a thoughtful and complete network that connects these systems. Sea level rise, changing precipitation, and warming temperatures, and other climate hazards have a profound impact on the category.

Critical Facilities

Seven critical facilities in urban heat island including three affordable housing and four rehabilitation/life care homes. A portion of Pilgrim Station is vulnerable to SLR 2050 but the storage of nuclear waste is being moved landward to avoid flood risk. Twenty-five dams are within a 1% Annual Chance Flood, and nine are in a 0.2% Annual Chance Flood. Only four dams are Significant Hazard

Drinking Water

95% of Plymouth's soils are sandy, excessively drained, and there is high risk to contamination both by saltwater intrusion and runoff into the Plymouth-Sole Source Aquifer. Saltwater intrusion could occur where the aquifer intersects with areas extensive coastal erosion. The mouth of Eel River, Manomet Point, and near Lookout Point are potential entry points. Aquifer contamination is also a potential where it presents at the surface in Plymouth's kettle ponds. Impaired ponds including Billington Sea, Savery Pond, Russel Mill Pond, and Halfway Pond could be areas for further investigation for aquifer contamination.

Wastewater

Plymouth has town sewer that serves approximately 10% of residences and commercial businesses in North and Downtown Plymouth. There are four areas where sewer lines are exposed to flooding: Cordage Park, Cordage Park, Nelson Park, Downtown Plymouth, Town Brook, and Stephens Field and there are four sewer pump stations that are exposed to flooding, with Knapp Station also exposed to SLR 2050. Most residents have Onsite Wastewater Systems (OSWS). White Horse Beach OSWS are susceptible to damage, exposure, reduced and public health exposure for residences located in a VE: High Risk Zone and reduced functionality with SLR 2050. Residences adjacent to ponds are susceptible

Stormwater

Major precipitation events or coastal storms associated can cause localized flooding and exposure when precipitation and runoff exceeds the system capacity and/or when ocean waters from storm surge enter the system through outfalls. The public health risk includes pollutant exposure in streets or waterbodies if stormwater is not able to filter through the catch basin. There are 70 stormwater outfalls vulnerable to SLR 2050 with approximately 4.6 feet of water.

Transportation

The transportation network is both a contributor to *and vulnerable to* climate change. It is the largest source of greenhouse gas emissions in Massachusetts and contributes to poor air quality causing heart disease, asthma/respiratory disease, cancer, premature, death, adverse birth outcomes, and adverse lung and brain development in children. Excessive pavement contributes the urban heat island effect, increasing ground surface temperatures and heat-related illnesses and respiratory and circulatory distress. Climate change degrades transportation networks with flooding, storm surge, extreme heat, and coastal erosion. There are 44 roads within a 1% and/or 0.2% Annual Chance flood zone, 17 roads vulnerable to SLR 2050, 27 roads located in an urban heat island >100°, and 12 vulnerable to coastal erosion >3 feet since 1970.

Environmental Exposure

Environmental exposure is the risk of human interaction with physical, chemical, biological, and radiological contaminants in the environment, or the interaction between humans and contaminants in the air, land, and water. Health disparities between race, income, sexual orientation, and others exist due to disproportionate exposure to environmental contaminants. Plymouth has three toxic sites that are vulnerable to flooding, Cordage Park Parking Lot 1A, Town Wharf at Brewers Marine, and 14 Union Street, the site of the former Weathervane Restaurant and four affordable housing complexes adjacent to toxic sites. There are four ponds with excessive algae vulnerable to cyanobacteria toxin exposure.

North and Downtown Plymouth have the greatest concentrations of air pollutants, including ozone and P.M. 2.5. in addition to the greatest urban heat island and lowest tree canopy cover. This exposure can lead to greater incidences of asthma, premature mortality, more frequent hospital visits, and lost school days. Plymouth has less asthma related emergency room visits and hospitalizations rates than the Massachusetts overall. Warming temperatures are expanding pollen concentrations with longer growing seasons. West Plymouth could experience greater allergies and severity.

Plymouth is highly vulnerable to vector-borne diseases, particularly Lyme and EEE. West Plymouth with large tracts of forest, ponds, and wetlands may be most vulnerable.

Parks and Natural Areas

Over 40 years of research has indicated the health benefits of parks, open space, and natural areas to communities. These range from active living, to reduced chronic disease, reduced environmental exposure, mental well-being, greater cognitive function, increased recovery from stress and trauma, reduced crime, greater social cohesion, and increased safety from transportation hazards.[2] Neighborhoods that have been marginalized by disinvestment often have lower access to quality parks and further enhance the health disparities

[2] "Green Cities: Good Health" 2018. University of Washington https://depts.washington.edu/hhwb/

to those already challenged with limited incomes, limited language skills, chronic medical conditions, exclusion and discrimination, or exposure to toxics and climate risks.

Parks

Nearly 30% of Plymouth is protected land. 86% of residents are within a 10-minute walk, 30% greater than the national average. Parks are equally distributed across income, age, and race. 48 parks are vulnerable to wildfire determined by historic wildfire pathways, 13 parks are vulnerable to SLR 2050, 18 are in an urban heat island, and 13 are exposed to VE, 1% and 0.2% Annual Chance Floods.

Ecosystem Services and Resilience

Plymouth contains 30,785 acres of exemplary natural systems or BioMap2 Core Habitat, more resilient to climate stressors and providing greater natural resilience to the community. Nearly 50% is protected. 54% of the land area is covered in tree canopy. It stores 1.65 million short tons and captures 22,147 tons of carbon annually. It avoids 198 million gallons of stormwater runoff valued at $1.8 million annually.

Plymouth has one of the largest contiguous tracts of pine barren forest across the globe. It is a fire-dependent forest-type that fosters germination of the pitch pine serotinous cones. Plymouth has experience two severe forest fires in 1957 and 1968. Recurrence could affect 3,722 worth $870 million. Public health risks to wildlife include displacement, financial hardships due to loss of property, stress, anxiety, post-traumatic stress, exposure to fire, debris, or toxics related to the wildfire and exposure to particulate matter (PM) from smoke inhalation.

Coastal Natural Assets

Plymouth Bay is an impaired water regulated for TMDL, is vulnerable to ocean acidification from CO_2 absorption diminishing marine species their ability to reproduce, and is also being monitored for *Vibrio* bacteria, a species that can cause food-borne illness with shellfish consumption. The bay has experienced a 36% loss of eelgrass meadows since 2007 minimizing shoreline protection and diminishing fish habitat. Ellisville harbor contains a 67-acre marsh that becomes submerged with SLR 2050. Mouth of Eel River, Plymouth Long Beach and Manomet/Stage Point have experienced the most severe coastal erosion with rates of up to -15.6 (±17.7) ft/year, -15.6 (±21) feet/year, and -5.5 (±2.8) feet/year respectively.

Housing

Housing is an important component public health and climate change risk. and vulnerabilities to climate change. Housing location remote to job centers can contribute to greenhouse gas emissions. Older housing can increase exposure to extreme temperatures, mold, pests, and other allergens. Low-income households also face greater utility cost-burdens and are less able to afford air conditioning increasing exposure to extreme heat. Discriminatory housing practices have concentrated socially vulnerable populations to neighborhoods with fewer trees, greater heat-trapping impervious surface, and consequently, greater exposure to poor indoor air quality and extreme heat. This can cause or exacerbate renal, cardiovascular, and respiratory conditions, such as asthma. Finally, housing cost-burdened households, especially renters, have

fewer resources with which to make repairs or access to temporary housing. They may face greater housing instability and displacement if their homes are damaged or destroyed due to extreme weather events.

Housing Stock and Affordability

54% of Plymouth's housing was built after 1969 and nearly 7% of Plymouth's housing stock is affordable. The average rent of a two-bedroom apartment is $2,043 and $1,986 for a one-bedroom apartment. 3,715 of renting households are spending more than 30 percent of their gross income on housing and 1,350 of those renters are severely cost burdened spending more than 50 percent of their gross income on housing. There are three affordable housing complexes vulnerable to urban heat island and coastal flooding in North Plymouth-an area burdened by low tree canopy cover, urban heat island, poor air quality, and greatest concentration of people of color

Housing Vulnerability (Coastal Zone Vulnerability Matrix)

There are 669 houses vulnerable to inland and coastal flooding. Saquish and White Horse Beach/Manomet are the most vulnerable areas with the greatest number of houses located in a flood zone, 288 and 280 respectively. The majority of these are in VE:High Risk zones indicating a high probability of repetitive loss. With SLR 2050, the long-term livability of these neighborhoods is compromised. Discussion for relocation are highly recommended for these low-resilient scoring

Economy and Employment

Public health, climate change, and economy are interconnected. Climate change can spur entrepreneurship such as $13.2 billion in Massachusetts GSP from the clean energy field, and scientists project that GHG reduction could prevent the loss of thousands of American lives and hundreds of billions of dollars in health-related economic benefits. However, climate change will create more negative impacts on the economy due to the potential for damage to infrastructure and public health with additional undue stress on those with lower economic status.

Employment and Income

Plymouth is a major employment center for the South Shore providing 32,000 jobs in 2020 prior to COVID. 37% of occupations are in management, business, science, and arts occupations and 24% in sales and office occupations. Nearly 25% of Plymouth industry is in Educational, Health Care, and Social Assistance. 12% is accommodation, food services, recreation, and the arts, the second most frequent occupation and highly vulnerable to disruptions form extreme weather or COVID.

7.5% of Plymouth households are below poverty level and 7.1% require food stamps. The medium income is approximately $84,000. The average male income is 3.4 times greater than female income and women over the age of 65 are the largest demographic living in poverty.

Safety

Threats to safety increase mental illness, substance use disorders, poor academic performance, involvement in the criminal justice system and greater risks to chronic conditions such as heart disease, lung disease, injury (and associated disorders such as bladder and kidney infection, circulatory conditions, central nervous system disorders, joint disease, eating disorders and more), and disabilities. They are also not distributed equally among all residents. Individuals with low incomes, communities of color, LGBQT, people with disabilities, children and seniors are at a greater risk of compromised safety. Climate change brings extreme weather events that increase exposure to communities. Climate related disasters such as nor'easters, coastal and inland flooding, drought, wildfire, extreme heat, and vector-borne that may cause conditions that increase the threat to safety. Extreme weather events may increase stress or agitation prompting greater prevalence of interpersonal violence, collective violence, and self-harm. A safer community is one that has prepared for and built resilience to climate change impacts and contributes to better health outcomes overall.

Safety in Plymouth

Plymouth has lower incidences of violent crimes than other major cities across the Commonwealth and the United States. There are approximately 283 aggravated assault crimes per 100,000 people in 2018. Property theft was the most prevalent form of violence in the community whereas arson, rape, and murder/manslaughter were the most infrequent crimes. This is an important strength of the community that should be supported to further enhance the safety from increased stressors from climate change.

Self-harm in the form of addiction can be a serious public health crisis in response to climate change impacts and mental health, particularly for Plymouth. 52.3% of Plymouth's patient treated for addiction in 2018 had received prior mental health treatment. Treatment for addictions in Plymouth have significantly increased to Heroin treatment from 24% in 2008 to 49% in 2017.

More data is required to understand the incidence of extreme weather events and sheltering in place on incidences of domestic in violence in Plymouth. Further, LGBQT community is particularly vulnerable to threats in safety, particularly for sheltering during extreme weather events and electricity loss. Further data is required to measure and minimize incidences in Plymouth.

Community Cohesion

Social cohesion enables communities to develop and enforce social norms (e.g. appreciation for nature, respect for elders), connects people to information and resources across social networks (i.e. social capital), and facilitates collective action. These factors are critical to our response to and recovery from weather-related disasters and other moments of crisis. Social isolation is among the strongest indicators of vulnerability to climate change. It limits access to information, resources, and social and emotional support systems. Public health risks of social isolation with climate change hazards include heat-related illness, injury, poor mental health such as higher rates of stress, anxiety, depression, and a wide range of physical health conditions.

Plymouth Community Cohesion

23% of Plymouth households consist of a single person living alone. Nearly 8% of Plymouth residents speak a language other than English; of those, 30% speak English less than very well. These are important factors for social isolation. Participants identified strong social bonds and a spirit of civic engagement as areas of strength for the Town of Plymouth. They also expressed strong support for increased levels of public outreach and engagement around climate issues and for climate action in close collaboration with neighborhood groups, community-based organizations and civic associations. Plymouth has a strong network of community service organizations including over 200 churches, social, environmental, and public health organizations.

Climate and Public Health Resilience Actions

Based upon extensive public engagement and responses from the Community Resilience Building workshop, the following are a summary of the Plymouth residents', stakeholders', and businesses' recommendations for acting on climate and public health. Participants voted for their top priority actions via poll at the Final Public Forum on May 26, 2020.

Plymouth Top Priority Actions

Increase Access to Recreation 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 using an integrated preparedness and communications plan that leverages diverse media, social networks, and neighborhood response teams to prioritize the wellbeing of vulnerable residents.

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.

Upgrade Residential Wastewater Systems by providing incentives and assistance to homeowners, so they can inspect and upgrade cesspools and septic system or connect to town sewer.

Promote Renewable Power and Energy Efficiency 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.

Society and 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 Actions

Protect the Shoreline using both structural and natural approaches, including sea wall maintenance, rigid revetments, dune nourishment, habitat restoration, and flood parks. Specific projects include:

Plymouth Long Beach

- Beach nourishment seaward of the dike from the main beach to the Crossover
- Nourishment/create cobble berm on harborside north of Crossover
- Mixed sediment nourishment at Warren's Cove
- Nourishment/stabilization of shoreline day parking to Crossover
- Nourishment/stabilization at point
- Marsh restoration on the harborside

White Horse Beach

- Dune and beach nourishment

Manomet Point

- Maintain coastal structure

Ellisville Harbor

- Coastal shoreline and inlet protection at Ellisville Marsh

Plymouth Harbor

- Reconstruct bulkhead at harbor between Wood's Seafood and Lobster Hut
- Reconstruct seawalls and revetments along Water Street – Plymouth Harbor

Increase Forest Management by developing a forest management plan and increasing staffing to maintain healthy forests and mitigate fire risks (e.g. thinning forests mechanically and with prescribed burns).

Continue Restoration Efforts focused on dam removal, flood mitigation, wetland and forest habitat expansion, while also monitoring and celebrating conservation successes (e.g. Living Observatory).

Jenney Pond Dam

- Repairs to Jenney Pond Dam
- Dredging of Jenney Pond
- Construction of bypass at Jenney Pond Dam

Cranberry Bog Natural Restoration

- Restore decommissioned cranberry bogs back to natural wetlands – town wide

Infrastructure

Mitigate Stormwater Runoff and Heat Islands from impervious surfaces by redesigning areas with excess pavement (e.g. install rain gardens), encouraging cluster development, and integrating stormwater management measures into new developments.

Safely Store Fuel Rods from the Pilgrim Energy Plant.

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 using regulations to prevent damage to homes and public infrastructure, promoting landward migration and by gradually buying and removing homes at highest risk for coastal storms and erosion.