Town of Southwick

Community Resilience Building Workshop
Summary of Findings

December, 2018

FUSS & O'NEILL

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FUSS & O'NEILL

Town of Southwick

Community Resilience Building Workshop

Summary of Findings

Overview

Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, and there is a clear need to involve municipalities, corporations, organizations, and the State in increasing resilience at all levels. Recent storm events affecting the region have highlighted many of the vulnerabilities that towns and cities face. Hurricane Irene and Superstorm Sandy brought intense flooding to many municipalities and threatened (or destroyed) infrastructure across the state. Extreme temperatures at both ends of the spectrum have pushed the limits of communities' preparedness to protect both infrastructure and people. In coastal communities, the impacts of sea level rise are felt daily and further exacerbate the impacts of other extreme events. Current climate modeling indicates that all of these hazards are expected to increase in frequency and scale over the coming decades. The Municipal Vulnerability Preparedness (MVP) program provides support and a prescribed process for cities and towns in Massachusetts to plan proactively for resiliency and implement key climate change adaptation actions.

In 2018, the Town of Southwick was awarded a $15,000 MVP grant to fund the planning stage of this process. The Town partnered with Fuss & O'Neill, a state certified MVP Provider, to complete a comprehensive, baseline climate change and natural hazard vulnerability assessment and develop a list of priority actions for the Town. This process involved the development of an MVP Core Team, which met on September 11, 2018 to determine initial concerns and worked to identify stakeholders within the municipality and set goals for the process. Those stakeholders were then invited to participate in a Community Resilience Building (CRB) workshop on October 2, 2018, engaging in a day-long, tried and tested process developed by The Nature Conservancy. The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experience to foster dialogue about the strengths and vulnerabilities within the Town. Workshop participants interacted at both large and small group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions.

The CRB 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 Southwick;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

Top Hazards and Vulnerable Areas

During the Community Resilience Building workshop, participants were asked to identify the top four natural hazards of concern for the Town of Southwick. Discussion of the top hazards built on earlier conversations that took place at the MVP Core Team Meeting, as well as ongoing Town conversations that formed the basis for the Town's 2016 Hazard Mitigation Plan update. The collective impacts of ice and snow were identified as one of the Town's top hazards. Wind events, such as those associated with severe storms, were identified as a second hazard. Flooding was identified as a third hazard. Finally, extreme heat, especially the increase in days over 90 degrees F, was seen as a fourth major hazard. These four hazards have already had demonstrated impacts on the Town, and as climate change progresses, these hazards are expected to have ever greater consequences for infrastructure and environment, as well as for various societal elements. Specific areas of concern are identified below.

Top Hazards

- Ice and Snow
- Wind
- Flooding
- Extreme Heat

Areas of Concern

While many impacts are expected to be felt Town-wide, certain elements, locations, or community groups present particular concerns.

Neighborhoods/Communities
Senior Residents

Events
Wick 338 Motocross events, Rugged Maniac

Ecosystems
Farms, Congamond Lakes, Great Brook, Canal Brook

Infrastructure
Industrial Drive, Route 57, Kline Road, undersized culverts

Facilities
DPW Garage

Current Concerns and Challenges Presented by Hazards

Major storm events have been a recurring threat to Southwick throughout its history, from hurricanes bringing wind, intense precipitation, and localized flooding to the inland community, to winter storms delivering ice and snow. Notable historic events include impacts from the Great Hurricane of 1938 and Hurricane Gloria in 1985, and the flooding of August 1955, when 25 inches of rain fell on the Town. In both 1938 and 1955, the Town office building was inundated with 8 inches of floodwaters.

More recently, the Town has been experiencing an increasing regularity of storms, with the so-called 100 year storm now happening several times a year. More intense storms delivering higher volumes of precipitation in a single event are expected to put significant pressure on dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation. The Town is also noticing a shift in the type and timing of storms. Many storm events now encompass a mixture of rain, ice, and snow, making it more difficult to maintain safe, accessible roadways. The major snow storm that hit in October 2011 is also still fresh in residents' memories. Due to the unusual timing of wet, heavy snow when leaves were still on the trees, that storm caused extensive damage to electrical infrastructure, leading to extended power outages. That same year, Hurricane Irene had a substantial impact on Southwick. Kline Road was washed out during the storm, and the Town experienced bridge washouts as well.

The already-occurring impacts of climate change are also visible in the Congamond Lakes that run along a portion of Southwick's border with Connecticut. The lakes are an important aspect of the Town's cultural identity, and also used to be an important part of the economy, particularly as sources of ice which was sold to southern locales on the railroad. In the past, the three lakes, North, Middle, and South, would freeze over with 30 inches of solid ice. Today, because of the changing climate, there is only 12 inches of ice on the lake in a good year, seasons of no ice are common, and ice does not last as long into the spring as it once did. Instead of a source of income, the lakes have become an expensive liability, with new problems like algal blooms and cyanobacteria that are linked to the impacts of warmer temperatures.

At the same time that the lakes are experiencing challenges, they are also becoming more important to the Town in the summer. As days above 90°F increase, having water available to residents for recreation and cooling off is increasingly vital for keeping people comfortable and safe. A student intern from Southwick High School reported that his classmates are getting sick because of the heat, especially as the schools lack air conditioning.

While it did not emerge as one of the top four hazards, Southwick also has concerns about drought. Over one third of the Town is served by private water wells, many of which are older, shallow wells. The extended drought during summer 2016 led to a number of issues with private wells that went dry. During peak use days, Southwick's public water supply is insufficient and the Town relies on supplemental water via a connection to Springfield Water and Sewer Commission.

Specific Categories of Concerns and Challenges

Infrastructural

Culverts and Bridges

Culverts and bridges are recognized as a potential concern town-wide. Culvert and bridge structures were designed to accommodate historic patterns of precipitation and runoff, which are rapidly transforming as a result of climate change. As the Town's DPW Director noted, design standards have changed, but the Town's infrastructure largely predates such changes and thus has not kept up with new standards. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding. Undersized structures at Klaus Anderson Road (at the Johnson Brook crossing), Fred Jackson Road, Kline Road, and Davis Road are known areas of specific concern.

Roads

Southwick has approximately 85 miles of roadways town-wide. Many roads in Southwick are vulnerable to flooding, as well as the impacts of snow and ice. In general, shifting weather patterns due to climate change are increasing the difficulty of maintaining those roadways. Pot holes and sinkholes are becoming more problematic due to new patterns of freezing and thawing that occur repeatedly throughout the winter season. Roadways in Town are also susceptible to blockages from trees and power lines brought down by wind storms, or closure due to isolated flooding. These impacts in turn compromise the Town's ability to provide emergency services. Southwick is good at mitigating emergency situations when roadway closures or other hazards develop, however, especially as climate change increases the frequency of risks, more focus on prevention of hazard conditions is necessary to increase the resiliency of Southwick's roads. Workshop participants noted that Route 57 is a particularly important roadway, as it serves as a strategic east-west route through Southwick that needs to be kept open to facilitate movement through the Town. Industrial Drive and Kline Road were also brought up as examples of roads where undersized culverts or washouts cause road overtopping during heavy precipitation events.

Water Supply and Water Infrastructure

The Town's current water supply allows for storage of sufficient drinking water to supply the Town for approximately one and a half days based on summer use rates, or approximately three days based on winter use rates. Water is stored in concrete tanks which are relatively robust to a variety of hazards, including two million gallons of storage behind Bonnieview Road. The Town is permitted for withdrawals of one million gallons per day. The Water supply infrastructure is all supported by back-up power, although some infrastructure is located in low-lying and potentially flood-prone areas. The largest concern regarding water supply centers around the geographic distribution of water infrastructure in Town. The west side of Town does not have public water supply access, meaning that one third to one half of the Town's residents are serviced by private wells. This is largely due to the fact that this part of Town is situated on shallow bedrock. For the same reason, the west side of Town does not have access to fire hydrants, which poses a challenge in terms of water supply for firefighting activities.

Stormwater Basins and Conveyances

Detention basins and other stormwater infrastructure are recognized as a potential concern Town-wide. Similarly to culverts conveying natural streams, there is a general recognition that much of the stormwater drainage system was designed to accommodate historic patterns of precipitation and runoff, and may be undersized as climate and weather patterns continue to shift. The Town's aging stormwater infrastructure and lack of maintenance funds exacerbates flooding potential during heavy rains. Further, development in Southwick has added to the amount of impervious area in the Town, which in turn has increased runoff and can increase flooding potential.

DPW Facility

The Town's DPW facility is both a strength and a weakness. In order to best serve the Town's needs, the facility needs substantial and costly renovations. Portable back-up power systems cover the fuel pumps and emergency communications systems, but do not provide sufficient power for lighting or other power needs. The facility has only one access point, which limits its resiliency.

Communications Infrastructure

Southwick's communication networks are vital to providing emergency services, but are vulnerable to a variety of climate change-related hazards, including wind, flooding, and snow and ice, all of which can take out communication infrastructure. Workshop participants also noted that there are dead spots in Town that are not well-serviced by the existing communications infrastructure. Lieutenant Landis noted that the Police Department cannot currently communicate with the school resource officer, because of a communication dead spot within the school buildings.

Electrical Infrastructure

The Town's electrical lines are similarly susceptible to hazard events. As demonstrated by the October snowstorm in 2011, power lines can be knocked out by snow and ice, in addition to wind events, causing extensive impacts to the Town. Extreme heat also stresses the electrical system, as increasing use of air conditioning leads to a risk of brown outs and outages, particularly if heat impacts are region-wide. Further, Southwick has no generation capacity of its own and relies entirely on transmission lines that bring power into the Town.

Wastewater and Septic

Southwick's sewer infrastructure is limited to the east side of Town, between Route 202 and the Congamond Lakes. The Town has an active infiltration and inflow program and performs yearly infiltration and inflow studies as a condition of their National Pollutant Discharge Elimination System (NPDES) permit. Because much of the Town's sewer system was installed in the early 2000's, they have to date had little issue with infiltration and inflow in their pipe network. The west side of Town, however, is served by septic systems, which are subject to failure and leakage, especially if subjected to flooding or overwhelmed by heavy precipitation.

Environmental

Wildlife

Concerns about beavers were discussed as an environmental issue, but also as an infrastructure problem. Whereas the Town generally has some record of and control over man-made dams or impoundments, beaver activity is often known only anecdotally, if at all, and can cause unpredictable problems during heavy precipitation, when flooding occurs in unexpected locations. Southwick has previously experienced problems at Kellogg Brook, where beaver dams above the brook broke after a heavy rain storm, causing a release of water that ultimately exposed nearby sewer and gas mains. Beaver impoundments have been known to flood and overwhelm septic systems in the Town as well. Other wildlife concerns include water quality issues associated with waterfowl populations, as well as human-animal conflict involving bears, coyotes, and fisher cats.

Lakes and Canals

Congamond Lakes currently have only one outlet, which empties to Canal Brook, part of the old Farmington Canal. The canal was originally 9 feet deep by 15 feet wide, but is now as shallow as one and a half feet deep in some areas, due to the accumulation of sediment and debris, driven in part by beaver activity. Both Great Brook and Canal Brook have been known to reverse flow during significant stormwater runoff events because of downstream blockages. Canal Brook has already had a sluicegate/weir system

installed to prevent backflows, but no such system exists on Great Brook at this time. Residents with property along the lakes and canals are facing major threats from erosion, and may be faced with significant costs to mitigate these risks.

Trees and Forests

Forests provide critical ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Street trees are likewise critical for infiltration of rainwater and provision of shade. However, trees and forests are also threatened by climate change. Participants noted that oak, maple, ash, and pine are all in decline either due to pests or changing climate. Wind and storms cause blowdowns, drought can contribute to die-off, new invasive pests (e.g. Emerald Ash Borer, Asian Longhorned Beetle) are eliminating certain tree species, and others are in decline due to shifting temperature and precipitation regimes that favor more southerly species. The Town's emergency services also recognize that hazard events can convert trees from assets to threats. The Town works closely with Eversource to ensure that hazard trees are removed before they can pose a significant risk to roadways or electrical infrastructure.

Invasive Species

Invasive plants and animals are already a source of concern in Southwick, as they are throughout the Commonwealth. Forest and upland ecosystems are threatened by a variety of invasive plants, including plants such as oriental bittersweet, multiflora rose, two types of swallowwort, and several non-native honeysuckles. Riparian and aquatic habitats are severely threatened by common reed, Japanese knotweed, invasive water chestnut, hydrilla, purple loosestrife, and Eurasian milfoil. Critical invasive insect pests already in the area include the Asian Longhorned Beetle and Emerald Ash Borer, both of which have the potential to do serious damage (both environmental and economic) to Massachusetts' forests and trees. These and other species already pose a significant challenge and have serious consequences for ecosystem health and resilience, and these impacts are likely to increase in response to climate change. Warming temperatures will also bring new invasives to the area, and these will have an easier time gaining a foothold if the Town's natural ecosystems are simultaneously weakened due to changes in climatic conditions.

Water Quality

Both the Congamond Lakes and the canals in Southwick are at risk due to nutrient pollution. These impacts are made worse by the increased erosion and stormwater runoff that accompanies heavy precipitation events. In recent years, algal blooms and aquatic weeds have been increasing, particularly during periods of extreme heat. The Town treated the lakes twice in 2018, using copper sulfate to control algal growth. The Lakes are also subject to an influx of bacteria due to both congregation of waterfowl on the lakes, and the fact that homes bordering on the Connecticut side of the lakes are served by septic systems. In 2018, the beach was closed for much of the month of August due to unacceptable bacteria levels.

Societal

Water-Based Recreation

Southwick's Congamond lakes are a popular source of recreation during both the summer and winter seasons. Winter recreation is threatened, however, by the decrease in ice cover. Whereas the lakes were once covered by 30 inches of ice in a typical year, ice cover is now substantially thinner (on the order of 12 inches), with no substantial ice cover at all in some years. These conditions increase the safety risks associated with recreation activities such as ice fishing and snowmobile operation. Similarly, new safety risks are now associated with summer recreation on the lakes, particularly due to the potential for harmful algal blooms/cyanobacteria and bacteria concentrations that make the water unsafe for recreational use.

Agriculture

Southwick is a right to farm community with a significant agricultural community and actively encourages the preservation of agricultural land. Farming operations range from vegetable farms to shade tobacco farms, to nurseries, to maple sugaring operations, all of which may be threatened by climate change hazards. An extended growing season brought on by climate change could have some positive effects, but drought, excessive rain (especially during the spring season), and changing temperatures may also have significant negative effects on agriculture and livestock operations of all types and scales. For instance, maple sugaring may no longer be economically viable at some point in the future, and some agricultural producers may be forced to consider alternate crops or altogether different sources of income.

Motocross Course and Recreational Events

Southwick is home to a number of unique recreational events that draw tourists to the Town. The Wick 338, located off of Route 57, hosts regional and national-caliber Motocross races from May through November and brings thousands of annual spectators and participants to Town, many of whom utilize on-site camping facilities during events. The Motocross course also hosts several thousand participants for the Rugged Maniac New England 5K obstacle race. These events bring critical tourism dollars to the Town, but also pose challenges during potential hazard events because of the stresses that a concentrated number of visitors would add to emergency response efforts. The site is also served by private wells and has suffered from insufficient water supply during droughts. During the extended drought of 2016 the wells at the course could not keep up with water needs for dust suppression to maintain the course during events.

Residential Property

Flooding of private homes is a concern, particularly along the lakes, where many of the older homes were built only a few feet above the lake level. Stormwater runoff from extended rainfall like that associated with recent precipitation events can cause up to a two inch rise in lake levels for every inch of rainfall, increasing the threats to private property. Protocols have put in place to limit boating and establish no wake zones when water levels are high to help prevent shoreline erosion and mitigate risk to the surrounding homes.

Vulnerable Populations

Workshop participants acknowledged the challenges of identifying and reaching vulnerable individuals, especially those who may no longer have a land-line telephone, or who may not self-identify as vulnerable. Certain populations, especially seniors, are known to be at higher risk during hazard events and may require support beyond emergency notifications. Workshop participants expressed concerns about seniors' ability to obtain food and medical supplies during hazard events, as well as the challenges involved in getting seniors to leave their homes (and sometimes their pets) in order to seek shelter elsewhere. Better understanding what these needs are and how the Town can best prepare to proactively support its entire population are areas that require more exploration. The workshop also identified potential impacts to key programs that serve these vulnerable populations, such as Meals on Wheels and Fuel Assistance programs, both of which may be impacted by extreme winter weather events.

Schools

Southwick's schools and student population are affected by a variety of hazard types. Schools are increasingly forced to cancel classes due to snow and ice events or extreme cold that make it impossible to safely get students to school. This, in turn, has the potential to extend the school year further into the summer, which exacerbates the risks that school will be in session during extreme heat events. As days above 90 degrees increase, heat stroke is a concern for the student population in general, as the schools are not air conditioned, and for student athletes in particular.

Pests and Disease Control

Climate change is affecting pests and disease vectors both through changing precipitation conditions and changing temperature conditions. Warmer, wetter conditions lead to increased mosquito populations, while the absence of sufficient periods of cold means that pest populations, especially ticks, that would historically have been killed off or reduced are able to survive the winter and emerge in greater numbers the following season. A recent CDC report showed that vector-borne diseases tripled between 2004 and 2016, with approximately 75% of cases being related to tick-borne disease. Further, as the Massachusetts climate begins to look more like the climate of the mid-Atlantic and southern states, we are seeing new types of diseases show up in existing pests, and new species of disease-carrying ticks and other pests moving into the New England states (e.g. mosquitoes carrying West Nile Virus or Zika and ticks carrying Rocky Mountain Spotted Fever). These changes present a major public and animal health challenge in terms of education, prevention, and treatment.

Provisions and Fuel

Maintaining access to essential supplies and fuel (for vehicles, heating, and generators) was a concern for workshop participants. It was acknowledged that power outages or road closures which affect access to these services could have extensive impacts on residents throughout Town. These issues are exacerbated for vulnerable populations. Participants did note that three of Southwick's major gas stations have back-up power, which is helpful for residents, but also draws extra traffic from neighboring towns when outages shut down other gas stations.

Stress on Emergency Services

Southwick's Fire, Police, and Public Works departments bear much of the burden of responding to the increased human threats that result from climate-induced hazards. An ever larger percentage of the departments' time and resources are being devoted to handling things like traffic accidents and injuries that result from ice or other dangerous conditions and activities to protect property and maintain traffic flows during storm events, and Public Works is relied upon to clear roads and maintain access throughout the Town. These departments are also tasked with the provision of shelter services in times of need. Emergency management personnel also noted the increase in crime that tends to accompany certain climate hazards, particularly heat waves. These issues are further complicated by the fact that many of the Town's police and fire personnel live outside the Town, so the departments can potentially be short-staffed at critical times if a hazard makes it difficult for responders to get to work.

Development

Over time, population increases and urban development have increased the impervious cover in Southwick, thereby increasing stormwater runoff and contributing to flooding problems throughout Town. As the Emergency Management Director noted, Southwick has been "its own worst enemy" in this regard. One participant noted that the North Loomis Street garage was essentially built in the middle of a brook, which has had lasting impacts on the structure and its surroundings. Likewise, participants noted the importance of discouraging any development within the Town's flood zones.


EXIT

Current Strengths and Assets

While the Town recognized a number of vulnerabilities, workshop participants identified key strengths as well. Southwick has a number of systems in place to facilitate emergency communications and information transfer, and the Town has obtained specialized equipment to help ensure that emergency services can be provided in a wide range of conditions. The Town has been proactive in establishing memorandums of understanding and mutual aid agreements that will support resiliency during hazards. Southwick also benefits from a partnership with Eversource, which has taken key steps to make their electrical infrastructure more robust and resilient.

- Southwick has preserved approximately 1000 acres of farmland over the last ten years, with one to two new farms preserved in perpetuity on an annual basis.
- The Town's Council on Aging maintains lists of senior residents and performs well-being checks during hazard events.
- Southwick has an existing Virtual Town Hall website that serves as an information hub for the Town's residents.
- The Town operates a Reverse 911 system that can be used to share information relevant to short-term hazards or expected long-term hazard events.

- Southwick has two vans to provide transportation to shelters and access to the Town's school busses for use in emergencies.
- Southwick has proactively transitioned to a fleet of 4-wheel drive emergency services vehicles, which allow for good movement through Town in conditions of up to 12 inches of snow.
- Southwick's schools already have back-up generators.
- The Town has existing mutual aid agreements with surrounding communities, however, the details of these agreements are not always fully understood by operations personnel.
- Southwick has identified reunification locations and meeting points for use during a hazard event.
- The Town has a comprehensive emergency management plan already in place.
- Southwick has established a mobile Emergency Operations Center that is ready for use in the event of a hazard.
- Southwick was the first StormReady Community in Massachusetts, and the second in all of New England.
- Three of Southwick's major gas stations are supplied with back-up power.
- Southwick's Police and Fire Stations are ideally located in a very central part of Town that provides good access to all parts of Town.
- The SAFE Program provides Student Awareness and Fire Education to students in Southwick's schools.
- The Town has already completed design and permitting for a culvert replacement at a known problem area on Fred Jackson Road.
- Southwick has grant funding to implement a Home Safety Checklist program that allows them to go into homes and check for safety issues that may pose additional concerns or exacerbate risk during hazard events.
- A house-numbering program is free for seniors and available at minimal cost to other residents in order to increase the ability of emergency services to locate residents during times of need.
- The DPW Garage has its own fuel pumps and emergency communications system, though these are currently covered only by portable back-up power systems in the case of an outage.
- The Town benefits from the efforts of Eversource, which has invested time and money into clearing hazard trees and improving the robustness of the electrical system through grid modernization. Eversource also maintains a list of potential hazard trees that could impact electrical infrastructure.
- Southwick has worked with Eversource to establish priority re-connection for critical facilities during power outages.

- Southwick benefits from its small-Town culture which facilitates cooperation and familiarity with one's neighbors and their potential needs during a hazard event.

Top Recommendations to Improve Resilience in Southwick

Participants at the CRB workshop identified a number of recommendations to address vulnerabilities and increase resiliency in three main topic areas: infrastructure, environment, and society. Management of water, primarily dealing with excesses of water due to flooding and managing the Congamond Lakes, was a primary concern that emerged in both the small and large group discussions. Providing sufficient water supply to the west side of Town and improving undersized or deteriorating infrastructure systems were a second major theme. Finally, as a small Town and tight-knit community, much attention centered around providing services to the Town's residents during hazard events, with particular attention to vulnerable populations.

Highest Priority

- Build on the Town's existing field inventory of culverts, and bridges to rank and prioritize projects for increased flooding resiliency and storm-hardening, followed by design and implementation of priority re-sizing or replacement projects. Green infrastructure, Low-Impact Design, and other nature-based solutions will be integrated with hard-infrastructure improvements to establish approaches that will be robust in the face of natural hazards and climate-change scenarios. Incorporate specific design and permitting for the culvert at Klaus Anderson Road and Johnson Brook that includes upstream stormwater management and flood resiliency improvements. Pursue funding and implementation for the already-permitted culvert replacement at Fred Jackson Road, and pay particular attention to known problem areas on Davis Road and Kline Road.

- Implement existing designs for an emergency outlet from North Pond to Great Brook near South Longyard Road in order to provide flood protection and limit the potential for erosion and damage to nearby properties.

- Develop and implement a weir or sluice gate system on Great Brook to prevent backflow during heavy precipitation events.

- Organize an inter-Town action to restore Canal Brook and Great Brook to their original depths by conducting dredging and by clearing both channels of debris and blockages, including beaver dam obstructions.

- Install cisterns in the northwest portion of town in order to provide water supply storage, especially for use in firefighting. Locations need to be chosen for two cisterns, with each having a capacity of at least 20,000 gallons.

- Raise road levels and rebuild road bases in critical low-lying or wetland areas.

- Increase enforcement of regulations related to maintenance of detention ponds. Ensure that the zoning enforcement officer has a list of all privately and publically owned structures.

Review Town regulations and make improvements, where applicable, to encourage maintenance of privately-owned structures by property owners.

- Perform a risk assessment of the wastewater pump stations and establish priority actions for reducing potential flooding impacts, including consideration of nature-based solutions or green infrastructure approaches. Establish plans to implement emergency back-up power for the pump stations.

- Assess cost-effective green infrastructure opportunities to develop a list of specific priority projects where reduction of stormwater runoff could mitigate flooding risk without the need to conduct expensive culvert replacement and resizing projects. Assess feasibility and cost, rank priority projects in terms of climate resilience potential, and develop concept designs for key projects. Review Town regulations and update as necessary to support green infrastructure and low-impact development approaches.

- Conduct robust education and outreach to build awareness of town resources and make Town residents aware of the many planning efforts, agreements, shelters, evacuation routes, etc. which are focused on making the Town more resilient to climate change impacts. Ensure that all residents know how to access these resources when they are needed.

- Prioritize expansion and reliability of gas mains serving Southwick to ensure that the Town is not cut off from gas supply during hazard events.

- Eliminate dead spots in the Town's communications infrastructure, with particular attention to ensuring that the schools can communicate with emergency services personnel.

- Establish a formal drought plan to detail appropriate actions to be taken during times of extended drought, with particular attention to developing alternate water supply sources for farmers, and providing for high water use events, such as Motocross events.

Moderate Priority

- Assess mosquito/tick/pest control options, including: viability study of joining existing mosquito control district versus options for the town to manage control independently, determination of future risks due to increase in type and quantity of pests/disease vectors due to climate change, and development of an education and outreach program.

- Post emergency evacuation routes with clear signage. Routes currently exist, but are not marked or well known.

- Assemble an emergency response trailer, including temporary signage to mark non-permanent evacuation routes, barricades, and other equipment to facilitate efforts to re-route traffic and keep residents out of hazard areas.

- Conduct a study to identify alternate sources of tourism funding in order to ensure that the Town's economy does not suffer as changing climatic conditions increasingly impact recreation opportunities in Town.

- Increase the efficiency of enforcement and inspections, including providing sufficient numbers of inspectors to effectively monitor and enforce regulations at the Congamond Lakes,

including traffic management. Ensure that businesses are able to be inspected and reopen in timely fashion after hazard events.

- Educate owners of private septic systems about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment from systems that become overwhelmed during periods of heavy precipitation.

- Increase coordination and cooperation with Suffield, Connecticut to protect the Congamond Lakes and address issues with erosion, algal blooms, waterfowl, and septic systems.

- Develop partnerships with local businesses to distribute information and help facilitate outreach efforts, particularly to vulnerable populations such as senior residents.

- Pursue public facilities upgrades that would increase resiliency, including long-term planning for relocation of the DPW garage to a location that would allow for multiple points of access. Install back-up power systems for the DPW garage and other critical facilities.

Lower Priority

- Develop a Town-wide plan to limit human/animal conflict, with a focus on maintaining open space corridors and appropriate habitat for large mammals (coyotes, bears, fisher cats), and establishing plans for beaver management.

- Update the Town's 2003 flyover at improved resolution to provide better, more detailed information for resilience planning.

- Encourage good building practices that minimize fire risk through minimization of vegetation at close range to structures, and use of non-combustible materials, such as concrete and aluminum siding.

- Develop a comprehensive tree and forests management program to identify, remove, and replace problem trees, preserve intact forests and street tree cover, provide guidance and resources for gradually moving toward more climate-resilient trees and forest communities (e.g. species that will tolerate warmer temperatures).

- Develop comprehensive invasive species management from inventory stage through management planning and implementation to address existing invasive populations that threaten features such as open space or forests, both of which contribute to resiliency, as well as anticipate new invasives that are likely to move into the area as climates shift.

CRB Workshop Participants

All workshop invitees are listed below; attendees are indicated with an asterisk.

Name	Position/Organization
Randy Brown*	DPW Director
Thomas Fitzgerald*	Health Director
Robert Landis*	Police Department
Dennis Clark*	Conservation Commission
Richard Stefanowicz*	Deputy Fire Chief
Charles Dunlap*	Emergency Management Director
Arthur Lawler	Building Inspector
Donnie Rickson*	Baystate Noble Hospital
Robert K Johnson*	Buildings and Grounds
Karl Stinehart*	Chief Administrative Officer, Board of Selectman
Cindy Sullivan*	Council on Aging
Dick Grannells*	Town Engineer
Connor Roy*	DPW Intern
Diane Caruso*	Library Director
Chris Faria*	DPW Supervisor
Kate Phelon*	Greater Westfield Chamber of Commerce
Nick Boldyga*	State Representative, 3rd Hampden District
Joe Deedy	Select Board
Russ Fox	Select Board
Doug Moglin	Select Board
Don Humason	State Senator, 2nd Hampden and Hampshire District
Kevin Bishop	Police Department
Kirk Sanders	Police Department
Russ Anderson	Fire Department
Alan Slessler	Town Planner
Art Pinnell	Finance Committee
Bob Horacek	Finance Committee
Cara Cartello	Parks and Recreation
Dave Gunn	Historical Commission
Laura Fletcher	Town Accountant
Mike McMahon	Economic Development Committee
Michelle Hill	Town Clerk/Treasurer
Bob Johnson	Buildings and Grounds
Tracy Stefanowicz	Eversource Energy
Maureen Callahan	Eversource Energy
Andrea Luppi	Eversource Energy
Ellen Cummings	Verizon
Eileen Leahy	Comcast
Bruce Augusti	MEMA
Jen Willard	School District
Steve Presnal	School District

Karen Wzorek	School Bus Garage
Dan Kelly	Housing Authority
Bruce Bussiere	Baystate Noble Hospital
Jim Hartman	Kinder Morgan
Dave Wood	Kinder Morgan
	Agricultural Commission
	Citizens Restoring Congamond
	Cemetery Commission

* indicates attendees

Citation

Fuss & O'Neill (2018). Community Resilience Building Workshop Summary of Findings. Town of Southwick, Fuss & O'Neill, Inc. Springfield, Massachusetts.

CRB Workshop Project Team: Name, Organization, Role

Name	Organization	Role
Randy Brown	DPW Director	Project Coordinator/Core Team Member
Thomas Fitzgerald	Health Director	Core Team Member
Robert Landis	Police Department	Core Team Member
Dennis Clark	Conservation Commission	Core Team Member
Richard Stefanowicz	Deputy Fire Chief	Core Team Member
Charles Dunlap	Emergency Management Director	Core Team Member
Arthur Lawler	Building Inspector	Core Team Member
Mary Monahan	Fuss & O'Neill	MVP Facilitator
Julianne Busa	Fuss & O'Neill	MVP Lead Facilitator/Scribe
Jessica Montagna	Fuss & O'Neill	Scribe

Acknowledgements

Many thanks to the MVP Core Team members, CRB workshop participants, and to Randy Brown who acted as the local Project Coordinator. Thanks to the Town of Southwick for providing a meeting space for the Core Team Meeting and CRB Workshop.

Funding for the CRB Workshop was provided through a Massachusetts MVP grant.

Appendix A

Final Risk Matrix

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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

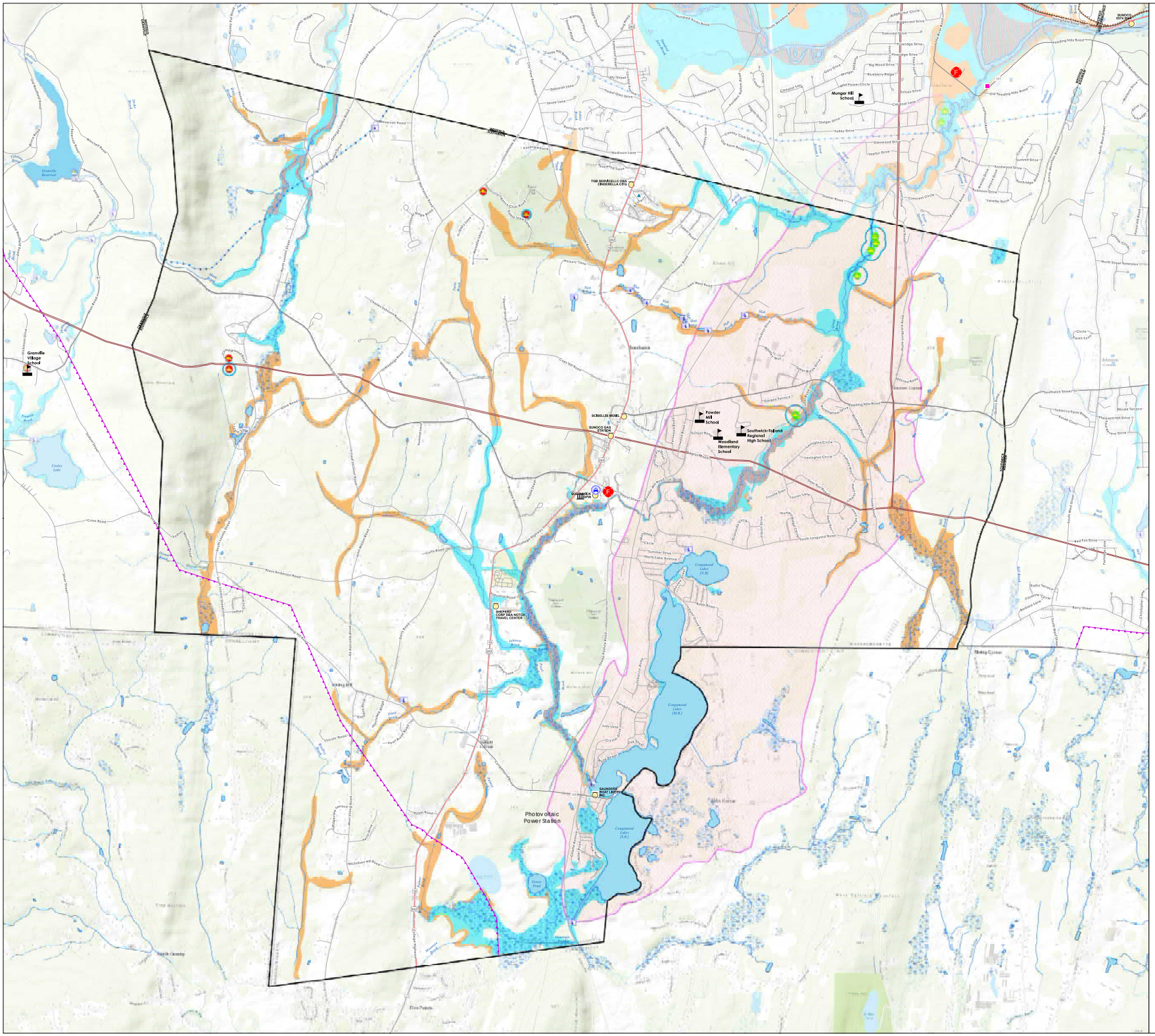
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flooding	Ice and Snow	Wind	Extreme Heat	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Culverts and Bridges	Town-Wide	Town	V	Build on the Town's existing inventory of culverts, and bridges: prioritize, design, and implement re-sizing or replacement projects; integrate green infrastructure and nature-based solutions. Incorporate design/permitting for culvert on Klaus Anderson Road, impelementation of existing designs on Fred Jackson Road, and explore known problem areas on Davis Road and Kline Road.				H	S
Roads	Town-Wide	Town	V	Raise road levels and rebuild road bases in critical low-lying or wetland areas				H	S
Water Supply and Water Infrastructure	Northwest Southwick	Town	V			Choose locations and install two 20,000 gallon water supply cisterns in northwest Southwick for use in firefighting		H	S
Stormwater Basins and Conveyances	Town-Wide	Private	V	Increase enforcement of regulations related to detention pond maintenance; review and revise regulations as necessary				H	S
	Town-Wide	Town	V	Assess green infrastructure opportunities and prioritize stormwater management projects; develop concept designs; review/revise Town regulations to support green infrastructure				H	S
DPW Facility	DPW Garage	Town	S	The DPW Garage has its own fuel pumps and emergency communications system				N/A	O
	Town-Wide		V	Pursue public facilities upgrades including long-term planning for relocation of DPW garage; install back-up power systems for DPW garage and critical facilities				M	S/L
Communications Infrastructure	Town-Wide	Town/Private	V	Eliminate dead spots in the Town's communications infrastructure, especially at schools				H	S
Electrical Infrastructure	Town-Wide	Town/Private	S		Southwick benefits from Eversource's work to clear hazard trees and establish priority re-connection for critical facilities			N/A	O
Wastewater and Septic	Town-Wide	Town	V	Perform risk assessment of pump stations, establish priority actions including nature-based solutions and plans for emergency back-up power				H	S
	Town-Wide	Private	V	Educate owners of private septic systems about the importance of system maintenance				M	S
Societal									
Water-Based Recreation	Congamond Lakes	Town/Private	V	Increase the efficiency of enforcement and inspections at the Congamond Lakes and ensure businesses are able to be inspected and reopen soon after hazard events				M	L
Agriculture	Town-Wide	Town/Private	S	Southwick has preserved approximately 1000 acres of farmland over the last ten years				N/A	O
Motocross Course and Recreational Events	Town-Wide	Town/Private	V	Establish a formal drought plan, with particular attention to developing alternate water supply sources for farmer, and high water use events, such as Motocross				H	S
	Town-Wide	Town/Private	V	Conduct a study to identify alternate sources of tourism funding to ensure that the Town's economy does not suffer as changing climatic conditions increasingly impact recreation opportunities				M	L

Residential Property	Town-Wide	Private	V			Encourage building practices that reduce fire risk	L	S
Vulnerable Populations	Town-Wide	Town/Private	S	Council on Aging maintains lists of senior residents and performs well-being checks; seniors have access to a free house-numbering program and a Home Safety Checklist program			N/A	O
	Town-Wide	Town	S	Southwick's Virtual Town Hall website serves as an information hub; the Town has two vans and access to the Town's school busses for use in emergencies and has identified reunification locations			N/A	O
	Town-Wide	Town	S	Southwick's small-Town culture facilitates cooperation and familiarity with neighbor's needs			N/A	O
	Town-Wide	Town/Private	V	Develop partnerships with local businesses to distribute information and help facilitate outreach			M	L
Schools	Schools	Town	S	Southwick's schools already have back-up generators; the SAFE program provides Student Awareness and Fire Education			N/A	O
Pests and Disease Control	Town-Wide	Town	V	Assess mosquito/pest control options, including viability of joining a mosquito control district, assessment of future risks due to increased pests/disease vectors, and education and outreach			M	L
Provisions and Fuel	Town-Wide	Private	S	Three of Southwick's major gas stations are supplied with back-up power			N/A	O
	Town-Wide	Private	V	Prioritize expansion and reliability of gas mains serving Southwick to ensure supply during hazards			H	S
Stress on Emergency Services	Town-Wide	Town	S	The Town operates a 3-1-1 / 2-1-1 call-back systemfor distribution of information			N/A	O
	Town-Wide	Town	S	Southwick has a fleet of 4-wheel drive emergency services vehicles, a mobile Emergency Operations Center, and centrally-located Police and Fire Stations; the Town is a StormReady Community with a comprehensive emergency management plan in place and existing mutual aid agreements with surrounding communities			N/A	O
	Town-Wide	Town/Private	V	Conduct education and outreach to build awareness of existing Town resources (planning efforts, agreements, shelters, evacuation routes, etc.) which make the Town more resilient			H	O
	Town-Wide	Town/Private	V	Post emergency evacuation routes with clear signage			M	S
	Town-Wide	Town	V	Assemble an emergency response trailer, including temporary signage and other equipment			M	S
Development	Town-Wide	Town	V	Update the Town's 2003 flyover at improved resolution			L	S
Environmental								
Wildlife	Town-Wide	Town/Private	V	Develop a Town-wide plan to limit human/animal conflict; focus on maintaining open space corridors and appropriate habitat for large mammals; establish plans for beaver management			L	L
Lakes and Canals	North Pond; Great Brook	Town	V	Implement existing designs for an emergency outlet from North Pond to Great Brook			H	S
	Great Brook	Town	V	Develop and implement a weir or sluice gate system on Great Brook to prevent backflow			H	S
	Canal Brook; Great Brook	Town/Private	V	Organize inter-Town action to restore Canal Brook and Great Brook through dredging and clearing channels of debris, blockages, and beaver dams			H	S
Trees and Forests	Town-Wide	Town/Private	V		Develop a comprehensive tree and forests management program		L	L
Invasive Species	Town-Wide	Town/Private	V	Develop comprehensive invasive species management from inventory stage through management planning and implementation			L	L
Water Quality	Congamond Lakes	Town/Private	V	Increase coordination and cooperation with Connecticut to protect the Congamond Lakes and address issues with erosion, algal blooms, waterfowl, and septic systems			M	L

Appendix B

CRB Workshop Base Map



SOUTHWICK, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

- Town Hall
- Police Station
- Fire Station
- School
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Dams
- Underground Storage Tanks
- Assisted Living Facility
- Nursing Home
- U.S. Highway
- State Route
- Non-numbered Road
- Pipeline
- Powerline
- Railroads - Active Service
- Perennial Stream
- Intermittent Stream
- Shoreline
- Manmade Shoreline
- Ditch/Canal
- Aqueduct
- Pond, Lake, Ocean
- Reservoir
- Wetland
- Wellhead Protection Zone I
- Wellhead Protection Zone II

Flood Zone Designations

- 1% Annual Chance of Flooding
- Regulatory Floodway
- 0.2% Annual Chance of Flooding
- Area Not Included

N
W E
S

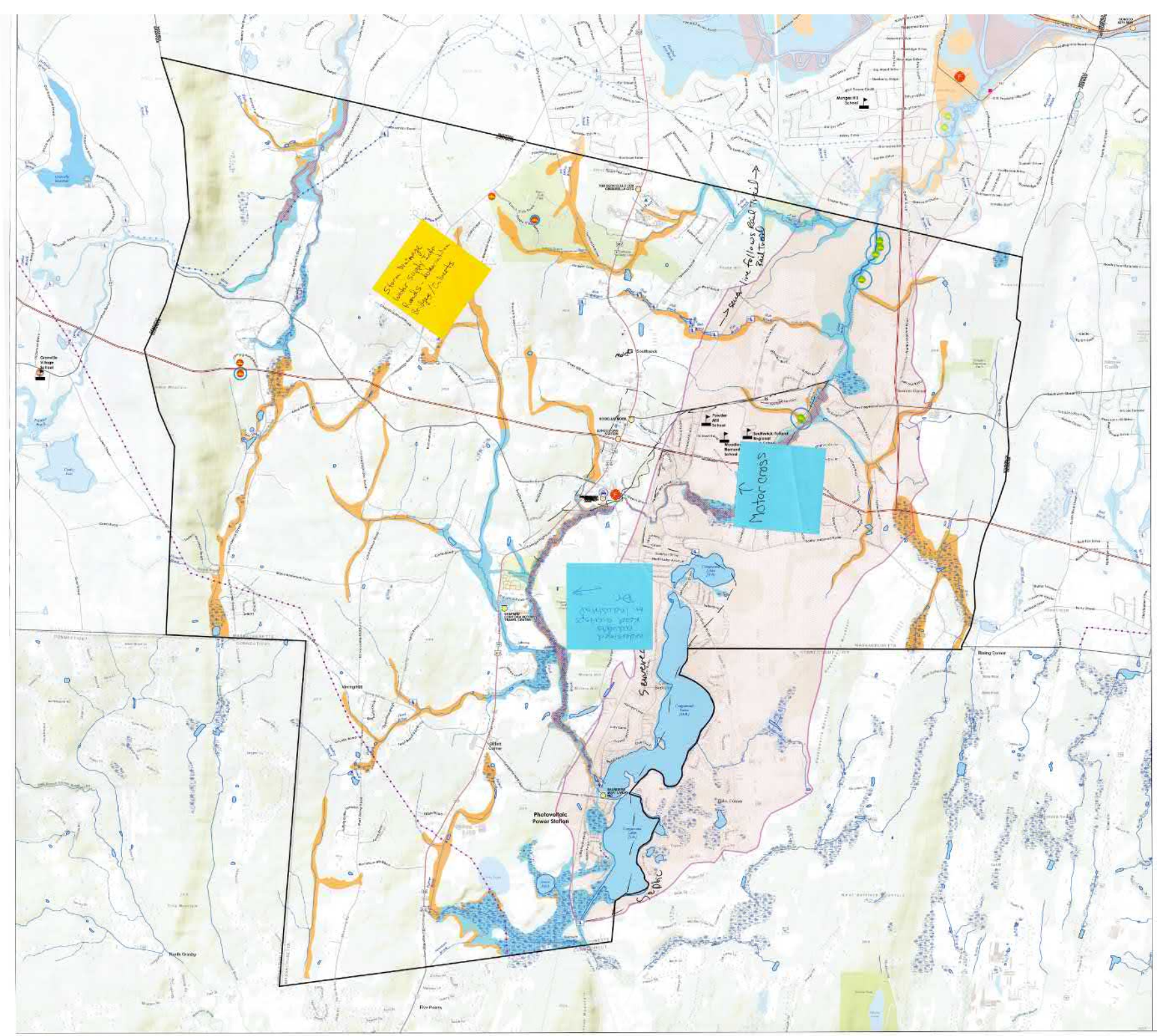
0 0.25 0.5 1
Miles

Data sources:
MassGIS - Infrastructure, Hydrology, and Administrative Data
ESRI - World Topographic Map - Base Map

FUSS & O'NEILL

Appendix C

CRB Workshop Outputs:
Participatory Mapping Exercise & Risk Matrices



SOUTHWICK, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

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FUSS & O'NEILL

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

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

Features	Location	Ownership	V or S	Flood	Snow / Ice	Heat	Wind	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Roadways - good @ mitigation emergency but work on plan (motorist sheet)									
DPW facility • backup generator installed to → new facility - two pts of access in emergency situation (Action Plan)								H	
Societal				inspectors needed in emergency situation for commerce					
Recreational - Boating - tough mudder - motocross - ice fishing						- inspection/entertainment - traffic		M/H	
Farming - tobacco				- increase in flooding		- drought - alt sourcing water - back up plan		H	
Environmental									

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

Features	Location	Ownership	V or S	Flooding	~~Storms~~ Snow / Ice	Heat	Wind	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Culverts / Bridges	Town wide	Town (Some private)	V	Continue inventory + inspections; prioritize for repair / replacement	→ "			H	O
~~Lakes~~ Elec. Substation / Lines	Town wide	Private Utility	S/V	Stability of trees	Keep lines clear of snow / ice		Tree removal in vicinity of system	H	O
~~Rivers / Streams~~ Gas Mains	Town wide	Private Utility	S/V		Prioritize expansion + reliability of gas mains. Loop Sperry. Westfield Ashburn Cor[illegible]			H	L
Communication Facilities	Town wide	Town	S/V		Reliability during storm events; Eliminate dead spots; lack of advanced technologies →	→	→	H	O
Water Supply / System	Town wide East side	Town	S/V	Prevent contamination of wells during flooding		Demand increase could exceed supply; Fire Protection		H	O
Sewer System	Lake region + Town center	Town	S/V	Prevent flooding of pump stations	Provide generator backup when needed →	→	→	H	O
Societal									
Septic Systems	Town wide	Private	V	Prevent flooding + contamination				H	O
Elderly Community / Disabled / Special Needs	Town wide	Private	V	Access to food, shelter, pharmacies, etc. Higher risk of illness.		Communications. Accessibility of public services to them.		H	O
Essential Supplies (Stores)	Town center	Private	V	Maintain access for all residents →	→	→	→	H	O
Crime / Service Calls (Emergency Services)	Town wide	Private	V	Road closures. Staff and materials	Accessibility during snow/ice. Sufficient staff to monitor calls.	Increase in calls during warmer times	Road closures - staff + materials	H	O
Fuel Sources (Heating, Vehicles, + Generators)	Town center	Private	S/V	Maintain access + operation of these facilities →	→	→	→	H	O
Evacuation Routes	Town wide	Public	S/V	Maintain ~~[illegible]~~ signage + access; funding to replace + install signs (permanent + portable) →	→	→	→	H	S
Environmental									
Lakes + Canals	Lake Region	Town / State	V	Prevent nutrient loading, shore line erosion [illegible] NORTH POND OUTLET [illegible]	Safety issues during ice conditions; misuse by snowmobiles + skimmers	Increase in algae blooms during heat. Algae Treat + Dredging		H	O
Rivers / Streams	Town wide	Town / Private	V	Prevent washouts, road flooding. Develop plan to prioritize + fund repairs			Remove vulnerable trees	H	OL
Wildlife (Beavers, Geese, Bears, Coyotes, cats, etc.)	Town wide	Private	V	Educate public of increased hazards →	→	→		M	O
Disease (Tick-born, mosquito, etc.)	Town wide	Private	V	Educate public of increased hazards →	→	→		H	O
Algae Blooms + E.coli	Lake Region	Town / State	V	Need funds for dredging + treatment →	→	→		H	O
CTY (Reverse 911)	Town wide	Town	S/V	Encourage residents to sign-up →	→	→	→	H	O
Detention Ponds	Town wide	Town / Private State	V	Provide proper maintenance (both public + private systems)	Recharge [illegible] mosquito & flooding			H	O

Transfer Station

Maintain access during flooding of Great Brook

re-connect

Priority exists list critical for critical facilities

Tree removal agreement w/ Eversource prevents ugly trees w/ potential future hazards

Need incident command training for all Town departments

COGENERATION WIND SOLAR

Southwick

Community Resilience Building Risk Matrix

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

Features	Location	Ownership	V or S	Flood	Snow/Ice	Heat	Wind	Priority H-M-L	Time Short Long Ongoing
Infrastructural Evacuation Routes	town-wide	Public		- improve routes/post routes - ensure access	- ensure routes are clear - equipment ward need to be purchased				
Culvert / Bridges / Detention Ponds (Roadway, Stormwater)	Town-wide	Public / Private	V	- Prone to flooding - redesigning capacity - Maintain / Maintenance - enforcement; detention ponds maintenance @ private facilities	- maintenance			H	
Elec. System - Lines - Substation	Town wide	Public / Private		- trees clear to prevent power lines; Develop Power back-up plan	- Clear trees to prevent outages; - look @ co-generation (wind, solar)		Clear / maintain trees to prevent outages	M	ongoing
Gas System - Single pt line extending on 57	Town wide	Private		provide emergency line				H	
Communication System • Drone - update GIS mapping	Town-wide	private	V	reliant on internet; Maintain access & remedy dead spots; look @ technology	need back-up generators; - expanding to ensure backup power; assess towers to ensure withstand storm		- Assess towers to withstand storm	H	ongoing
Water Systems - underground water systems - Wells - Drinking	"	Public / Private	S/V	- Prevent contamination + pumps have backup power	- What is the backup plan + manage potable water	• Bldgs • pumping stations need upgrades • firedrack • up wells & install new wells		Fire protection H, ongoing M	
Sewer System / Private Septic Systems	"		S/V	- Prevent flooding - Flooding - somewhat permanent back-up power	- flooding; maintaining access to facilities	- [illegible]	- maintain access	H	
Societal				- get them what they need.	Predictable vs. emergency	• House numbers • Home safety checklist - Senior center • Hazard avoidance programs / website	# in schools		
• Elderly / disabled / special needs	town-wide	Public	V	- Maintain access to shelter; food - Rx; - Public outreach	• Public outreach - predicted • prevent falls / illness; • snow fall; • transportation to shelters	- Communication - facilitate sign-up - Shelter... etc. - church-city	buses can be used in emergency	M	ongoing
Essential Supplies				- maintain access to them; - Ability to get around town				M	
Emergency Services during events				- Staff for extreme events for maintenance + executive; - some supplies - Conex	- maintain access for emergency; - need for Mack Mobile signs	- increase in ambulance + services in calls in hot days - increase	- road closure - staff / system in place to detect	H	
Homes near waterfront				- value of homes [illegible]; homes near nominal lake level	• Canoe brook is only outlet	- common		H	
Schools - Schools are all in good shape + updated.			V/S	- Closing long term	- long term school closure	- excessive heat - long term school closure - A/C to schools - cost - nsba won't do it		L	
Trees - salt = death?									
Environmental 1800s				• to Prevent backflow - Weir gates & sluice gates - Dredging	Great Brook needs this.	Flooding cont. • detention ponds • CT has septic systems around ponds • stream lake bank erosion • accessibility to put in weir gates	low cost	• Cyanobacteria - dredging	
• lakes / canals / waterbodies				- nutrient loading, dumping events + backflow; Shoreline erosion	- Safety - mis-using lakes on ice - snowmobiles on ice; - econ impacts	- increase algal blooms - lakes needs dredging + treatment		H	
• rivers + streams				- washouts + Road flooding - Klein Road				H	
wildlife Beavers, geese, coyote, foster cats - Abounding throughout town + flooding growth				- public outreach; - Beavers; - no predators - not allowed to hunt	- access to dams (Dredging)	Prevent beaver dams		L	
Vectors - tick born - issues				• Clean up standing water • Public outreach	- spraying - eliminate standing water			L/H	
Vegetation				- vegetation control		- vegetation control • good bldg practices + infrastructure to respond to fire	education / outreach - planning + zoning?		
Roadways				All impacted by roads; lots of sand-based roads; Hydrant by-law + enforcement	recreate the roadways	raising roadway grades b/c a lot are in wetlands; - potholes; DPW - list of Roadways that require maintenance			

Notes in margins:

- Dredging
- Communication - Public outreach
- 1st - die-offs
- Partnership - utilize local businesses - need ppl to respond to rescue 911 - AM radio station
- Action: Sat. communication for emergency; expanding cellular service; virtual town-hall group
- Underground water storage - cistern storage Granville Rd.
- Fire
- enlist other orgs to draw people; educational / community outreach
- Action Item: connect city - community - two separate programs - social
- b/c it's saturated w/ notifications
- @ the waterways - AISE projects interstate - communication w/ CT + waterways + find federal grants
- vegetation - geese stay all winter - used to be able to sell harvest ice in winter - used to be able to canoe in ponds
- Public outreach
- Public outreach
- Stormwater Drainage
- Great Brook aquifer
- water quality issues
- • Risk mgt → drone purchase → GIS - 2004 last updated mapping. → allow updates to mapping

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

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

Features	Location	Ownership	V or S	Flooding	~~Storms~~ Snow / Ice	Heat	Wind	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Storm drainage	Town Wide	Public / priv.	V	Monitoring Replace Basin Cleaning, Netting Pipelines, Mgt Funding	Mountain Outlets				
Roads / bridges / culverts → Deterioration	"	Public	V	Mountain Repair Potholes, Base layer, Tree Maint Funding	Tree Maint. Widen Roads	Tree Maint.	Tree Maint.		
Water Supply Infrastructure	East End	Public	V/S	MORE HYDRANTS / more pumps	Hydrant By-Law needed,	Assess/upgrade pipelines + pump Stations, wells			
Communications	Town Wide	Public	V/S	Low Power AM Notification Broadcast Broadcast Warning					
DPW Garage	661 Collegeway	Public	V/S	Major overhaul, generator	back-up power		new facility w/access from 2 roads		L
Societal									
Boating / Lakes	East	State	V/S	More Inspectors, Policing					
Golf Courses	Town Wide	Private	V						
Farms – tobacco	Town Wide	Private	V	pumping/drafting - Backup Supply Plan					
Motocross / Rugged Maniac Events	Powder Mill	Private	V						
Ice-Fishing tournaments	Lakes	Public	V	Alternate Tourism draw					
EOC / Public Safety / P.D. / F.D.	Center	Public	S	Eliminate dead zones → Change Frequency					
Environmental									
Beavers	Town Wide	P/P	V	prevention					
Geese	"	"	V						
Bears / Coyotes	"	"	V	Education, Less Building protect open Space					
Insects / Ticks	"	"	V	Vaccines, Spraying, Infiltrate Stormwater					
Invasives	"	"	V	Treatment, education					
Cyano Bacteria	Lakes	"	V	Treatment, Comprehensive dredging					S,O

economic impacts

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **U**ngoing)
V = Vulnerability **S** = Strength

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

Features	Location	Ownership	V or S	Flooding	Heat	Wind	Snow/Ice	Priority H-M-L	Time Short Long Ongoing	Actions
Infrastructural										
Roadways (85 miles) (202)	Town wide	State, Town	V/S	Isolation	Fires	Blocked / No emerg services	- Long term, potholes sink holes,	(H)		Maint/Standard upkeep.
Destruction of local homes	Town wide	Residents	V/S	Homes		- Isolated incident	- Damage only - usually not destructive	(M)		Assistance programs
Bridges / culverts	Town		V	Long term repairs			Thaw, overflow meltwaters	(H) Fred Salisbury [illegible]	(S)	Upkeep $$ Maint Re-design
Communication (Virtual town hall)	Town	Town / Private residents	V	↓ systems		↓ systems	Downed power lines			Info 211 Rev 911 - user
Power supply (Eversource)	Town	Private	V		Brown out outages					Local provider (W.G.E.) Arborists
Schools	Town	Town	V	Closed	Ø A/C	Ø utilities	Cancelation extended school year			
Societal										
Communication	Town wide									Wellness w/ on resp.
- Notification system (Facebook, Rev 911)			S/V	Lacks impact	+S Awareness of shelters etc		Lacks impact advertise resources.			Redundant
Education		Town Private								
Elderly / Public outreach	Town wide		S/V	Local impact.	Shelters COA well being (V.)	Isolated	Meals on wheels Fuel assistance			Visits Extra meals
Schools			S	School closed long term / students transferred						Home schooling
Environmental										
Drinking water				Contaminated	- Restrictions ↑ Bacteria					Stored
Elderly					Illness Heat stroke		Falls on ice etc.			Back-up medical supply. Back up O2 medical → to patient
Ecologically				Standing water	↑ Infestations ticks		Longer seasons ice/thaw			Education recognition
Remaining population (school age parents)										
Fire risk					↑ Dry					Vegetation control. 2nd water supply. Good building prac[tices]
Water supply				Contamination	Fire					Immediate restr[ictions] transported to to[illegible] National Guard Boiling order

Solutions
Fire Cisterns
Flooding $$$ culverts - study water control
Heat
Snow/ice

Appendix D

CRB Workshop Presentation Materials

FUSS & O'NEILL

Boston Firefighters, January 4, 2018 (Reuters)

Congamond Lakes North Dike, Southwick, MA (Mapcarta)

Municipal Vulnerability Preparedness Program
Community Resilience Building Workshop
Town of Southwick

October 2, 2018

Community Resilience Building Workshop

Agenda

- CRB Team and participant introductions
- Introduction to Massachusetts Municipal Vulnerability Preparedness Program (MVP)
- Introduction to Climate Change and the Town of Southwick
- Discussion by Southwick participants on status of current planning and risks
- Introduction to CRB Workshop process

- Large group
  - Determine top four hazards

- Small work groups (Using Risk Matrix)
  - Identify Southwick's vulnerabilities and strengths
  - Prioritize response actions

- Lunch

- Large group
  - Report out from small groups
  - Determine overall priority actions for the Town

- Discussion on next steps
- Conclusion

FUSS & O'NEILL

Fuss & O'Neill Overview

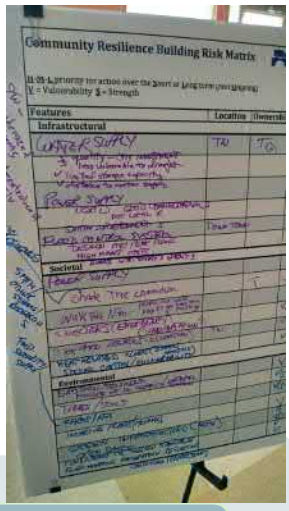
Fuss & O'Neill is a leading MVP consultant in assisting Massachusetts communities secure grant assistance, achieve designation as a Massachusetts Municipal Vulnerability Preparedness (MVP) community, and execute their MVP priority projects.

The MVP team is experienced in local government, environmental services, civil site engineering, stormwater management, and emergency management.

Fuss & O'Neill assisted new MVP communities secure more than $700,000 MVP Action Grants in the program's first funding round.

Southwick MVP Program - $15,000

- Grant Supports Climate Change Vulnerability Assessments and Resiliency Planning
  - Comprehensive Approach
    - o Infrastructure
    - o Society
    - o Environment
  - Guidance in the Community Resilience Building Workshop Guide
  - Municipalities That Complete This Process Will Be Designated Municipal Vulnerability Preparedness (MVP) Municipalities



MVP Designation Leads to Enhanced Standing in Future Funding Opportunities

MVP Action Grant NEW

- Grant supports priority actions identified at Community Resilience Building Workshop
- $10,000 - $400,000 available
- Local match of 25% - can be in-kind
- Next funding round anticipated Fall 2018

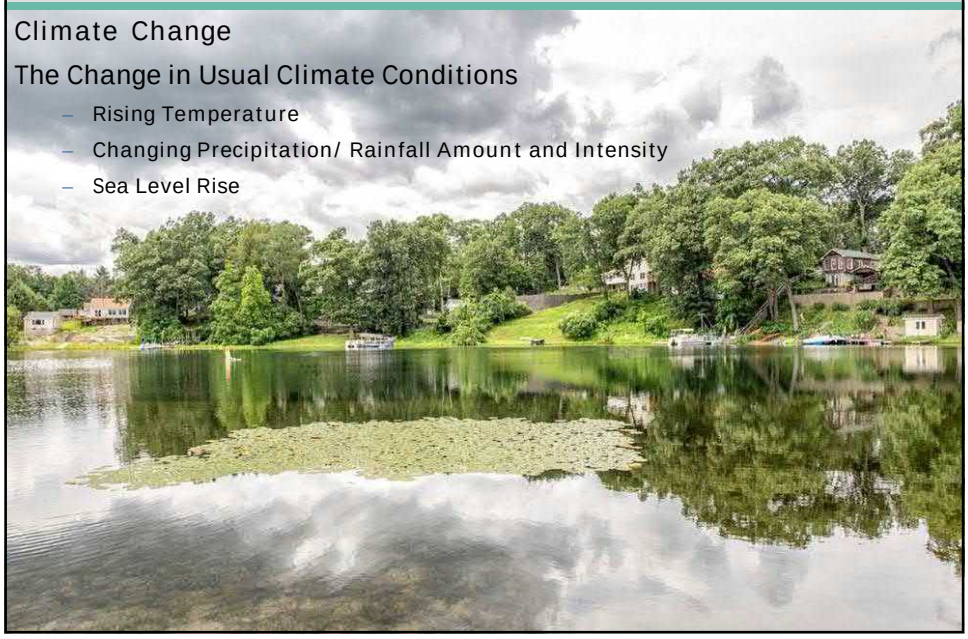
Only those communities which have completed the CRB workshop are eligible to apply

Terminology

Climate Change

The Change in Usual Climate Conditions

- Rising Temperature
- Changing Precipitation/ Rainfall Amount and Intensity
- Sea Level Rise



Town of Southwick – Westfield Basin
Minimal Farmington and Connecticut Basins

Rising Temperature

Westfield Basin	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Average Annual Temperature (°F)	45.01	2.27 to 4.55	3.08 to 6.63	3.64 to 9.18	4.16 to 11.18
Annual Days with Maximum Temperature over 90°F (Days)	2.75	3.90 to 12.64	5.70 to 24.05	7.18 to 42.37	8.76 to 59.56
Annual Days with Minimum Temperature below 32°F (Days)	166.59	-10.89 to -27.83	-20.14 to -38.37	-22.41 to -52.99	-24.19 to -62.16

Town of Southwick – Westfield Basin
Minimal Farmington and Connecticut Basins

Changing Precipitation

Westfield Basin	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Total Annual Precipitation (Inches)	50.70	-0.24 to 5.11	1.18 to 6.85	2.04 to 8.06	2.08 to 9.10
Annual Consecutive Dry Days (Days)	16.80	-0.26 to 1.40	-0.28 to 2.17	-0.65 to 2.27	-0.47 to 2.64

Climate Change Impacts - Temperature

- Economic
  - Winter Recreation
  - Snow and Ice
- Agricultural
  - Longer Growing Season
- Health
  - Increased Pests
  - Heat Stroke
- Infrastructure
  - Road Buckling
  - More Potholes
  - Power Outages
- Environment
  - Change in Habitat

Climate Change Impacts - Precipitation

- Economic
  - Dangerous Floods
  - Lost work time
- Agricultural
  - Excessively Wet Spring
  - Drought
- Health
  - Flood/High Water-related Deaths
  - Emergency Response Delays
- Infrastructure
  - Road Washout
  - Environment
  - Sewer System Overflows
  - Compromised Bridges
- Changes in Habitat

Stakeholder Updates

Risk Matrix

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.com

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

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

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

MVP Program

- Identify Top Four Hazards
  - Review MVP Sectors
  - Maps as tool
  - List infrastructure, societal, environmental feature
  - Determine whether a vulnerability or strength
  - Identify actions to reduce vulnerability or reinforce strength
  - Prioritize actions
  - Report Out
- Finalize Prioritization Plan

Climate Change Hazards

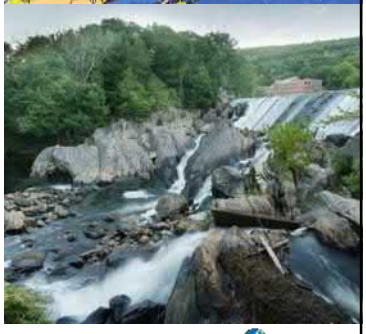
- Flooding
- Extreme Precipitation Events
- Heat Waves
- Drought
- Snow/Ice
- Wildfire
- Tornadoes
- Hurricanes
- Nor'easters
- Other

MVP Sectors

- Infrastructure
  - Evacuation routes
  - Schools
  - Roads, bridges, dams
  - Water and wastewater
  - Septic systems
  - Hospitals
  - Commercial Buildings, churches
  - Utilities: electric, gas
  - Factories
  - Emergency management facilities

MVP Sectors

- Societal
  - Emergency shelters
  - Senior housing
  - Schools and campuses
  - Economically challenged populations
  - Evacuation plans
  - Animal shelters
  - Hospitals, pharmacies
  - Grocery stores
  - Utilities: electric, gas
  - Homeless
  - Other



MVP Sectors

- Environmental
  - Drinking water supply
  - Rivers and streams
  - Parklands
  - Agriculture
  - Title V systems
  - Stormwater management
  - Open spaces
  - Flood plains
  - Forest
  - Other

Community Resilience Building Workshop

Next Steps:

Public Review of Priorities
Monitor and Update
Annual Review

Community Resilience Building Workshop

Questions?