CANTON COMMUNITY RESILIENCE BUILDING WORKSHOP

NOVEMBER 16, 2018
WORKSHOP AGENDA

I. Kick-off 9:00 am
II. Hazards 9:40 am
   o Presentation and large group discussion
III. Break 10:30 am
IV. Community Strengths and Vulnerabilities 10:45 am
   o Presentation
   o Small group exercise
   o Small groups present findings
V. Lunch 12:00 pm
VI. Community Actions 1:00 pm
   o Presentation
   o Small group exercise
VII. Break 2:45 pm
VIII. Priority Actions 3:00 pm
    o Small group exercise
    o Small groups present findings
IX. Summary and Closing 4:00 pm
INTRODUCE YOURSELVES!

- Name

- Affiliation
  - (department, organization, business, resident, etc.)

- One of your favorite things about Canton
  - (community value, place, thing, person, etc.)
GROUND RULES

1. Everyone must participate (and listen)
2. Everyone’s input is equally valued
3. Disagree without being disagreeable
4. No side conversations
5. Stay on topic
II. HAZARDS

What are Canton’s past, current, and future hazards?

- Extreme Heat
- Brush Fires
- Drought
- Heavy Rainfall
- Ice/Snow Storms
- Wind
- Drought
WHAT IS CLIMATE CHANGE?
II. HEAVY RAINFALL - HISTORIC

- Heavy rainfall already causes flooding in Canton.
  - March 2010
- Impacts: infrastructure, property damage, loss of life/injury, natural resources

Two types of rainfall flooding:
- Overbank flooding (Neponset River)
- Drainage flooding

![Graph showing annual precipitation from 1886 to 2017 at Blue Hill Observatory. The graph includes data for maximum, minimum, and record mean precipitation over 10-year and 30-year periods. The graph shows a trend of increasing precipitation over time, with notable peaks in certain years.](image-url)
HEAVY RAINFALL – HISTORIC RIVERINE AND PIPED INFRASTRUCTURE FLOODING

Private dam washout 2010

Neponset St
**HEAVY RAINFALL – FUTURE PROJECTIONS**

- Total annual rainfall will increase
- Heavy rainfall events will become more frequent

*Source: resilientma.com, 2018*
Heavy Rainfall - 2030
HEAVY RAINFALL - 2070

Source: resilientma.com, 2018
HEAVY RAINFALL

Source: Design storm projections for the Boston metro area based on Kleinfelder/ATMOS projections, Nov. 2015, Kleinfelder for City of Cambridge.
SNOW/ICE STORMS
**Snow/Ice Storms**

- We know how to handle snow!
- In Canton’s region, there are historically about 119 days per year where temperatures reach below freezing.
- That number could be reduced down to 77 by the year 2050.
- Resulting in more precipitation falling as rain or freezing rain.

*Source: resilientma.com 2018*
Figure 4-64: Number of Days with 5 Inches of Snow or More

Source: 2018 SHMCAP report
Typically, damaging winds are classified as those exceeding 50-60 mph.

Damaging winds can occur from microbursts, blizzards, tropical storms, etc.

Impacts: town resources, infrastructure, private and public property.
EXTREME HEAT – PRESENT HOT SPOTS
EXTREME HEAT - 2030

[Map showing projected change in # days above 90°F by decade and season for 2030s. Legend includes values: +8.3, +11.3, +16.5, +23.1, +28.4.]
There will be more days required for cooling buildings than for heating by 2070.
EXTREME HEAT — PUBLIC HEALTH

Human health issues:

• Heat-related illness and mortality
• Air quality, asthma
• Vector-borne diseases
**Drought**

- More rainfall in large events could mean longer gaps with no rainfall locally.
- Could impact natural resources:
  - Trees
  - Water quality
  - Aquatic organisms
  - Aquifers / Canton’s wells
DROUGHT

Figure 4-10: Statewide Drought Levels Using Standardized Precipitation Index (SPI) Thresholds, 1850-2012

Source: Massachusetts Drought Management Plan, 2013
DROUGHT – CONSECUTIVE DRY DAYS 2030

Source: 2018 SHMCAP report
DROUGHT – CONSECUTIVE DRY DAYS 2070

Source: 2018 SHMCAP report
Brush Fires

- Like wind, brush fires are typically a result of dry ground conditions and drought.

- Approximately 90% of wildfires in Massachusetts are caused by humans, the other 10% by lightning.

- Impacts: natural resources, infrastructure, private and public property.

Source: CBS Boston c/o Dustin Fitch)
Figure 4-58: Wildfire Risk Areas for the Commonwealth of Massachusetts

Source: Northeast Wildfire Risk Assessment Geospatial Work Group, 2009

Massachusetts State Hazard Mitigation and Climate Adaptation Plan
September 2018

Source: 2018 SHMCAP report
BRUSH FIRES

Source: CBS Boston c/o Dustin Fitch)
II. VOTE FOR YOUR 4TH HAZARD
AND PROVIDE A REASON

• What hazards have impacted your community in the past/present?
  • Where, how often, and in what ways?

• What is exposed to climate threats now and in the future?

• What have been the impacts to operations and budgets, planning and mitigation efforts?

Fill in Top 4 Hazards on Risk Matrix
III. Break – 15 mins

Canton Community Resilience Building Workshop
IV. Strengths & Vulnerabilities

What are Canton’s infrastructural, societal, and environmental strengths and vulnerabilities?
Examples of infrastructure include:

- Bridges
- Roads
- Municipal Buildings
- Emergency Operations
- Schools
- Dams
- Utilities – overhead & buried
- Wells
- Drainage pipes
INFRASTRUCTURE

Shepard Pond Dam, Photo credit: Stephens Engineering
Combination of factors and forces that affect the susceptibility of various groups within a community to harm, as well as their ability to respond positively after extreme events.

“The death toll was the result of distinct dangers in Chicago’s social environment: an increased population of isolated seniors who live and die alone” – Eric Klinenberg
Combination of factors and forces that affect the susceptibility of various groups within a community to harm, as well as their ability to respond positively after extreme events.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
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<tr>
<td>2016</td>
<td>23,352</td>
</tr>
<tr>
<td>2020</td>
<td>24,225</td>
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<tr>
<td>2025</td>
<td>25,299</td>
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<tr>
<td>2030</td>
<td>26,272</td>
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<tr>
<td>2035</td>
<td>27,073</td>
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¹ Population from U.S. Census Bureau

Canton Stats: Age and Population
SOCIETY

Vulnerable populations, post-incident are most likely to be effected by lack of access to recovery services, displacement, injury, illness, loss of employment, and property damage.

Canton Stats: Income

<table>
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<tr>
<th>PER CAPITA INCOME</th>
<th>MEDIAN HOUSEHOLD INCOME</th>
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<tbody>
<tr>
<td>Canton</td>
<td>$49,206</td>
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<tr>
<td>USA</td>
<td>$29,829</td>
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<tr>
<td>Canton</td>
<td>$93,672</td>
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<tr>
<td>USA</td>
<td>$55,322</td>
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</tbody>
</table>

INDIVIDUALS BELOW POVERTY LEVEL: 6.4%
SOCIETY

Get to know your neighbors!

Canton Stats: Foreign Born Residents

FOREIGN BORN CANTON RESIDENTS: 

14.1%
**ENVIRONMENT**

Benefits of natural systems include:

- Flood storage
- Recreation and tourism
- Cooling during heat waves
- Biodiversity conservation
- Water filtration
- Mobility

Vulnerabilities

- Water quality and quantity
- Invasive species
- Damage from extreme weather

*Photo: Canton Citizen*

*Reservoir Pond, photo by Town of Canton Engineering staff*
Environment

Environmental Challenges:

- Erosion
- Invasive plant material
- Chronic flooding
- Sedimentation
- Ground and Surface Water Pollution
- Impaired Water Bodies
IV. Resilience & Vulnerabilities

What are Canton’s infrastructural, societal, and environmental strengths and vulnerabilities?
What are Canton’s infrastructural, societal, and environmental strengths and vulnerabilities?
IV. RESILIENCE & VULNERABILITIES

What are Canton’s infrastructural, societal, and environmental strengths and vulnerabilities?

- **Vulnerability**
  - Town-wide
  - Multi-Neighborhood
  - Single-Neighborhood
  - Specific Location

- **Ownership**
  - State
  - Town
  - Private
  - Shared

- **Features**
  - Vulnerability
  - Strength
  - Both
IV. Resilience & Vulnerabilities
Small Group Exercise

• What infrastructure, societal features, or important natural resources are exposed to current and future hazards?
• What makes them vulnerable?
• What makes them resilient?
• What are the consequences if the existing vulnerabilities are not addressed?
V. Lunch — 1 Hour

Canton Community Resilience Building Workshop
VI. COMMUNITY ACTIONS

Case Studies

Hazards

Features

Strategies
WET FLOODPROOFING
Community Action

First floor door
Ground

Openings provided to let floodwaters enter

Subgrade basement

Living area

Furnace and other utilities relocated to living area or utility room addition
RAISED BUILDINGS
Community Action

DECORATIVE FLOOD WALLS

Community Action

Source: ABC News, KAAL TV

Source: FloodBreak

Source: Terrascapes Landscape Design
DEMOUNTABLE FLOOD PANELS

Community Action
Preventing Sewer Backflow
Community Action

Backflow Preventer Valve

Pros:
• Closes automatically

Cons:
• Flap can get stuck (fail)
• Requires maintenance

Sewer Shutoff Valve

Pros:
• Reliable

Cons:
• Someone has to close it
Evaluate building a vegetated berm at elevation 23.15 feet CCB* along the Fresh Pond Golf Course. This strategy could effectively protect the Fresh Pond Reservoir for up to the 2070 100-year sea level rise / storm surge flooding.

*Cambridge city-base datum
Benefits of LID

- Flow Control
- Detention
- Retention
- Filtration
- Infiltration
- Treatment

Source: Garbini & Garbini Landscape Architecture, Inc.
PERMEABLE PAVEMENT
Community Action

Source: Green Planet Ethics
DUAL-USE FLOOD STORAGE
Community Action

Athletic Field

Flood Storage
Explore innovative options for managing stormwater

Jan Rasmussen, City of Copenhagen
Gehard Hauber, Rambøll, Atelier Dreiseitl
Climate Adaptation

North Point Park

Open Spaces

Canal Streets

Dual-Use Flood Storage
Community Action
Multi-Benefit Water Infrastructure

Community Action

Single Purpose

Multi-Benefit

Source: San Antonio River Authority
MULTI-USE LEVEES
Community Action

Flood Protection

Mobility
CLEAR COMMUNICATION
Community Action

Winter Weather Service Update
January 5, 2018

Regular Schedule
Commuter Rail, Buses, Subway
Regular schedule

Regular Schedule
Mattapan Line
Regular schedule. May be replaced with buses; check alerts.

No Service
Ferries
No service

Visit mbta.com for updates.

Emergency Notification System
Keeping our citizens informed

Sign up for CODERED
15 million tons of deicing salt are used each year in the United States
Other options?
What would Dwight Schrute do?

Source: NBC The Office
STAY ON TOP OF MAINTENANCE
Community Action
Reduce Asphalt with:

- Infill development
- Native Landscaping
- Solar power canopy devices
Reduce Asphalt with:

- Infill development
- Native Landscaping
- Solar power canopy devices

Source: Almaden Solar

Source: Tree Link News
Cooling centers are:

Air-conditioned public facilities where people may go for relief during periods of extreme heat.
**ALTERNATIVE ROOFS**
Community Action

White Roofs

Green Roofs
Drought Action Level Response signs are located around the Town of Harwich. These signs, as well as our website, are updated when an action level is active.

<table>
<thead>
<tr>
<th>ACTION LEVEL</th>
<th>RESPONSE</th>
<th>FREQUENCY OF MONITORING</th>
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</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td>NORMAL WATERING CONDITIONS</td>
<td></td>
</tr>
<tr>
<td>ADVISORY</td>
<td>VOLUNTARY WATER RESTRICTIONS ODD/EVEN DAYS</td>
<td></td>
</tr>
<tr>
<td>WATCH</td>
<td>MANDATORY: ODD/EVEN LAWN WATER &amp; OFF-PEAK HOURS</td>
<td></td>
</tr>
<tr>
<td>WARNING</td>
<td>MANDATORY: 2 DAY PER WEEK OUTDOOR USE &amp; OFF-PEAK HOURS</td>
<td></td>
</tr>
<tr>
<td>EMERGENCY</td>
<td>MANDATORY: BAN ON ALL NON-ESSENTIAL OUTDOOR WATER USE</td>
<td></td>
</tr>
</tbody>
</table>

Source: Harwich Water Department
VII. DROUGHT MANAGEMENT PLANS
Community Action
VI. COMMUNITY ACTIONS

Small Group Exercise

• What actions will reduce vulnerabilities or reinforce strengths?
• Do they address single or multiple hazards?
• Are there intermediate steps to implement the actions?
• Are there existing programs, plans, or projects that the actions could strengthen?
VII. Break – 15 mins

Canton Community Resilience Building Workshop
VIII. PRIORITY ACTIONS

Factors to consider:

• Funding availability and terms
• Agreement on outstanding impacts from recent hazard events
• Necessity for advancing longer term outcomes
• Contribution towards meeting existing local and regional planning objectives
VIII. PRIORITY ACTIONS
Small Group Exercise
VIII. PRIORITY ACTIONS

• Group 1
  • Strategies

• Group 2
  • Strategies

• Group 3
  • Strategies

• Group 4
  • Strategies
IX. SUMMARY AND CLOSING

- Reflections
- Next Steps
- Ways to stay involved
THANK YOU!!!!

The Kleinfelder Team
Robin Seidel
Nathalie Beauvais
Indrani Ghosh
Andrew Goldberg
Kirsten Ryan