Outline

Problem:
• How will climate change impact your community?

Solutions:
• What actions can conservation commissioners/agents take?
  • GI/LID
  • Climate-smart regulations

Next steps:
• Where’s the money climate-smart natural resource protection?
  • MVP program
Key Observed Climate Changes MA

- **Temperature**: 2.9°F (Since 1895)
- **Growing Season**: 11 Days (Since 1950)
- **Sea Level Rise**: 11 inches (Since 1922)
- **Strong Storms**: 55% (Since 1958)
Boston: 6 ft Sea Level Rise
Global Climate Change and Boston Harbor

(Thanks for the irony, Secretary Beaton)
How Summer Temperatures Will Feel Depending on Future Greenhouse Gas Emissions

2070-2099
Higher “Business as Usual” Emissions

By the end of the century, summers in Massachusetts will "feel" more like summers in the South.
Future Precipitation: Drier Drys and Wetter Wets
How Much More Precipitation?

Total annual precipitation has increased by:

15%

1.2 trillion more gallons of water or equivalent snow falling on Massachusetts each year.

~9,700 filled Prudential Towers

Changes are calculated from a linear regression of annual totals from 1895-2015, 1901-2000 reference period. Source: NOAA
Consider where that water goes

Source: EPA
Consider where that water goes
Climate change

- increased precipitation
  - stormwater & WQ issues
  - flooding & infrastructure damage

- increased temperature
  - heat-related illnesses
  - more cooling shelters

Development

- impervious surfaces
  - increased flooding & infrastructure damage
There are real solutions. One of the best adaptation practices is preserving natural areas.
Nature-Based Solutions use natural systems, *mimic* natural processes, or *work in tandem with* traditional approaches to address natural hazards like *flooding*, *erosion*, *drought*, and *heat islands*.

Incorporating nature-based solutions in local planning, zoning, regulations, and built projects can help communities reduce their exposure to these impacts, resulting in reduced costs, economic enhancement, and safer, more resilient communities.
Lots of **solutions**, lots of **benefits**

Source: Center for Neighborhood Technology’s The Value of Green Infrastructure
Free ecosystem services:
Free services provided by the natural landscape

- **Flooding**: Floodplains provide flood protection and reduce infrastructure damage.

- **Public Health**: Managing stormwater and reducing retention ponds reduces creation of mosquito habitat.

- **Air Quality & Public Health**: Trees reduce the urban heat island effect, reducing smog creation and resulting asthma occurrences as well as reducing nitrogen dioxide and particulate matter.

- **Water Quality**: Streamside vegetation filters pollutants and reduces erosion.

- **Water Quantity**: Forests and wetlands store water, improve water quality, and recharge groundwater.

- **Recreation**: Clean, flowing waters support recreation, including boating, fishing, and swimming while open space provides areas for hiking and biking.

- **Quality of Life**: Open space and street trees create a more enjoyable walking environment, benefiting community connection, health, and economic benefit in downtowns and commercial areas.

- **Property Value**: Healthy, mature trees add an average of 10-30% to a property’s value.

Every $1 invested in land conservation offers a $4 Return on Investment in terms of these ecosystem service values.
Nature based solutions at every scale
Rural, suburban, or urban

**Conserve** available open space providing ecosystem services

**Integrate** concepts into new development at neighborhood scales

**Restore** resilience in urban areas at site specific scale
Massachusetts Forests Mitigate Climate Change

- MA forests sequester 14% of the state’s gross annual carbon emissions
- Average acre stores 85 tons carbon
- Capacity increases over time as forests mature
Cost Savings & Improved Safety:
Charles River Natural Valley Storage Area
US Army Corps of Engineers

- 8,095 Acres purchased or protected in the middle and upper Charles River watershed since 1977. Project Cost of $8,300,000

- From 1977 through September 2016, the project has provided $11,932,000 in flood protective services (not counting for inflation).

- Co-benefits include recreation and natural resource benefits

In Hurricane Sandy, wetlands reduced $625,000,000 in direct flooding damages in New Jersey.

In New England, wetlands reduce storm damage by approximately 16%.
Identifying **Barriers**

From the Climate Action Tool survey, 2015

*Note! 70% of respondents were municipal professionals, but most already engaged in land conservation.*
### GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE

<table>
<thead>
<tr>
<th>Factors</th>
<th>Conventional</th>
<th>Better</th>
<th>Best</th>
<th>Community’s Zoning</th>
<th>Community's Subdivision Rules &amp; Regulations</th>
<th>Community’s Site Plan Review</th>
<th>Community’s Stormwater/LID Bylaw/Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils managed for revegetation</td>
<td>Not addressed</td>
<td>Limitations on removal from site, and/or requirements for stabilization and revegetation</td>
<td>Prohibit removal of topsoil from site. Require reseeding and other prep of soils compacted during construction</td>
<td>(Not applicable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lineic clearing, lawn size, require retention or planting of native vegetation/naturalized areas</td>
<td>Not addressed or general qualitative statement not tied to other design standards</td>
<td>Encourage minimization of clearing/grubbing</td>
<td>Require minimization of clearing/grubbing with specific standards</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Require native vegetation and trees</td>
<td>Require or recommend invasives</td>
<td>Not addressed, or mixture of required plantings of native and nonnative</td>
<td>Require at least 75% native plantings</td>
<td></td>
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</tbody>
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### GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL

<table>
<thead>
<tr>
<th></th>
<th>Conventional</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Lot size</td>
<td>Required minimum lot sizes</td>
<td>OSRD/NRPZ preferred. Special permit with incentives to utilize</td>
<td>Flexible with OSRD/NRPZ by right preferred option</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
</tr>
<tr>
<td>Setbacks</td>
<td>Required minimum front, side, and rear setbacks</td>
<td>Minimize, allow flexibility</td>
<td>Clear standards that minimize and in some instances eliminate setbacks</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
</tr>
<tr>
<td>Frontage</td>
<td>Required minimum frontage for each lot/unit</td>
<td>Minimize especially on curved streets and cul-de-sacs</td>
<td>No minimums in some instances, tied into other standards like OSRD design and shared driveways.</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
<td>(Not applicable)</td>
</tr>
<tr>
<td>Common driveways</td>
<td>Often not allowed, or strict limitations</td>
<td>Allow for 2-3 residential units</td>
<td>Allow for up to 4 residential units, preferably constructed with permeable pavers or pavement.</td>
<td>(Not applicable)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

massaudubon.org/bylawreview
Boston Wetlands Protection Ordinance: climate focused

“These land resources are too valuable to lose to development—they’re important not just for conservation, but to guard against severe flooding and heat that disproportionately harm our most vulnerable residents and communities. This is an issue of social and environmental justice.”

– Boston City Councilor Michelle Wu October 26, 2018
Boston Wetlands Protection Ordinance: climate focused

- **Resource values protected:** “adaptation to climate change”
- **Alter:** “decreasing the capacity of wetlands to respond to the impacts of climate change”
- May require stormwater calcs based on **500 year flood**
- Defines/encourages **GI and Nature-Based Solutions**
- No permit for planting **natives**
- Protects Special Transitional Areas for **landscape migration**
- Commission may separately designate **areas of critical environmental concern**
- Requires integration of **climate resilience** into project
Write it down: **Linking** Local and Regional **Green Infrastructure**

- Ways to consider linking:
  - Comprehensive/Master Plans,
  - Cluster subdivision requirements,
  - Open space districts,
  - Transfer of development rights,
  - Water resource protection overlay districts,
  - Floodplain management,
  - Wetland protection districts and bylaws
  - Open space plans
Massachusetts State Hazard Mitigation and Climate Adaptation Plan

September 2018
Municipal Vulnerability Preparedness (MVP)

www.resilientma.org

State and local partnership to build resiliency to climate change

1. Engage Community
2. Identify CC impacts and hazards
3. Complete assessment of vulnerabilities & strengths
4. Develop and prioritize actions
5. Take Action
Baker Administration’s Support

EO562 Language:
“…strategies that conserve and sustainably employ the natural resources of the Commonwealth to enhance climate adaptation, build resilience and mitigate climate change…”
Municipal Vulnerability Preparedness Process

Municipal Vulnerability Preparedness Program

- Executive Order 569
  - TNC trains Service Providers to use Community Resilience Building (CRB)
  - EEA provides 71 municipalities with awards for CRB process
- Trained Certified Service Provider
- Awarded Municipality
- Local CRB process develops plan
- Municipality becomes a Certified Community
- Municipality is now eligible for EEA awards for implementation funding

Municipal Participation
- Individual Communities
- Regional Partnerships
Funding

MVP Communities Receive Priority

- Clean Water State Revolving Fund Program (CWSRF)
- Office of Coastal Zone Management (CZM)
- Department of Agricultural Resources (MDAR)
- Executive Office of Energy and Environmental Affairs (EEA)
- Mass Department of Environmental Protection (DEP)
- Mass Environmental Trust (MET)
Community Preservation Act (CPA)

Creates a dedicated local fund (with state matching funds) for:

- Open space & outdoor recreation
- Historic preservation
- Community housing
Community Preservation Act (CPA) by the numbers...

175 communities

30 cities

50% municipalities

$2,000,000,000+ raised

10,900+ projects

2,200+ recreational projects

29,000+ acres

60% population
5 things conservationists can do

1. **Apply** to become an MVP community & participate in the core team

2. **Talk** to your neighbors, fellow board members, and community members about climate change and nature based solutions

3. **Advocate** to adopt the Community Preservation Act or support CPA projects

4. **Work with** your planning board to adjust local bylaws & regulations that support climate smart nature based solutions

5. **Vote** in local, state, and federal elections to promote candidates that support climate smart solutions and funding
Ten things everyone can do to help build climate-resilient communities

1. Divert downspouts and adopt a stormdrain
2. Replace impervious areas or lawn with natives
3. Plant trees at home & in the city
4. Don’t wash your car in the driveway & pick up pet waste
5. Reduce lawn watering, mowing, and fertilizing
6. Walk, bike, or use public transit
7. Eat less meat
8. Switch to renewable energy
9. Support conservation groups & open space
10. Talk about climate change & make it normal
• MACC: maccweb.org
• Mass ECAN (Ecosystem Climate Action Network): massecan.org
• Shaping the Future of Your Community: massaudubon.org/shapingthefuture
• Resilient Taunton Watershed Network (RTWN): srpedd.org/rtwn
• Resilient MA: resilientma.org
• TNC Naturally Resilient Communities: naturallyresilientcommunities.org
Thank you!

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