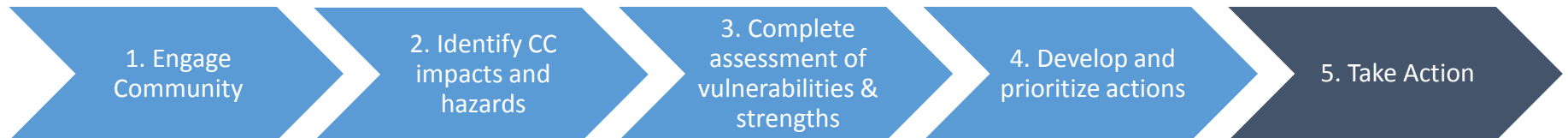




# Municipal Vulnerability Preparedness (MVP)

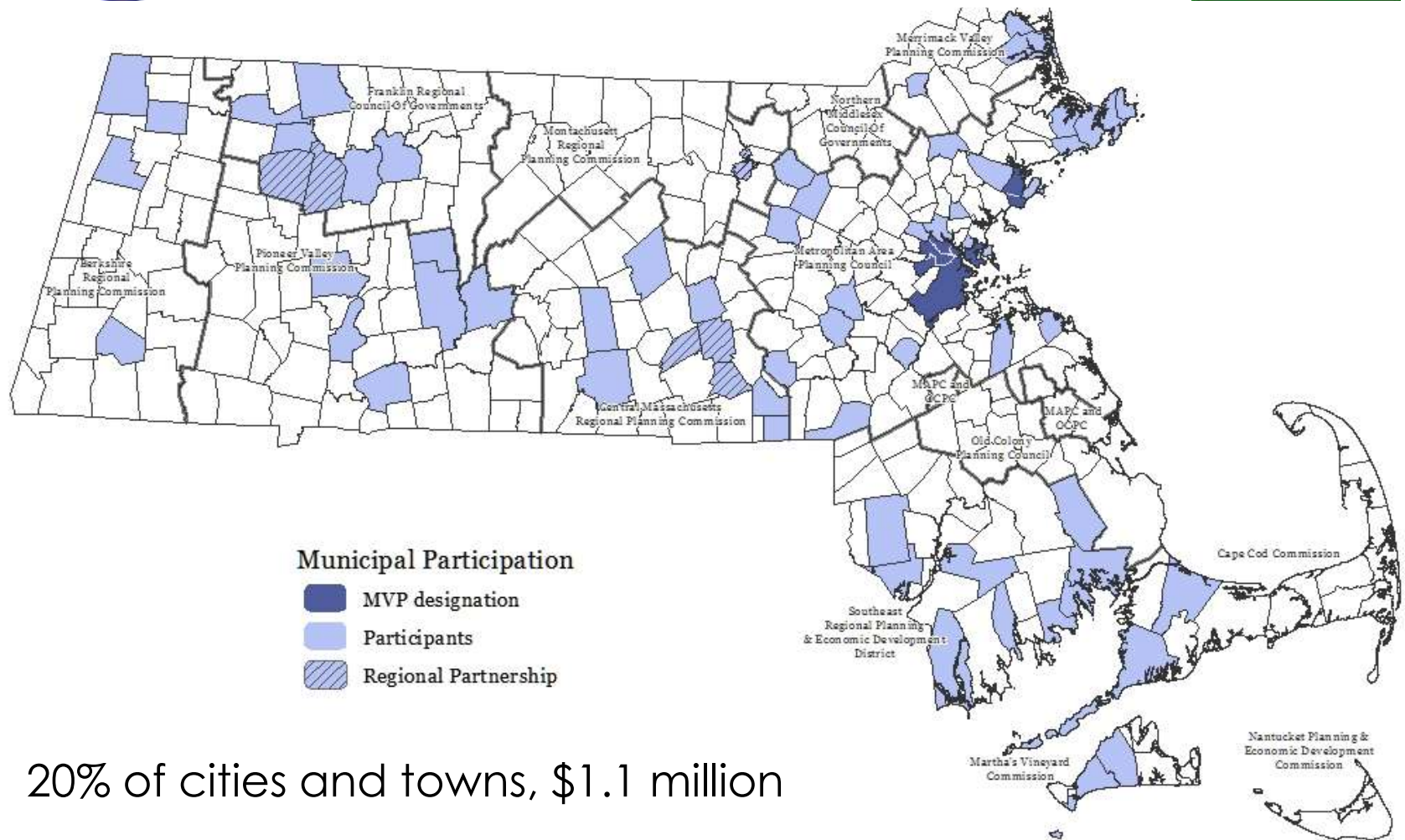


*State and local partnership grant to build resiliency to climate change*





# MVP Program 2017-2018



20% of cities and towns, \$1.1 million



# MVP Program

## Learn more



<https://www.mass.gov/municipal-vulnerability-preparedness-program>

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# Reviewing Bylaws to Encourage Climate Smart Solutions

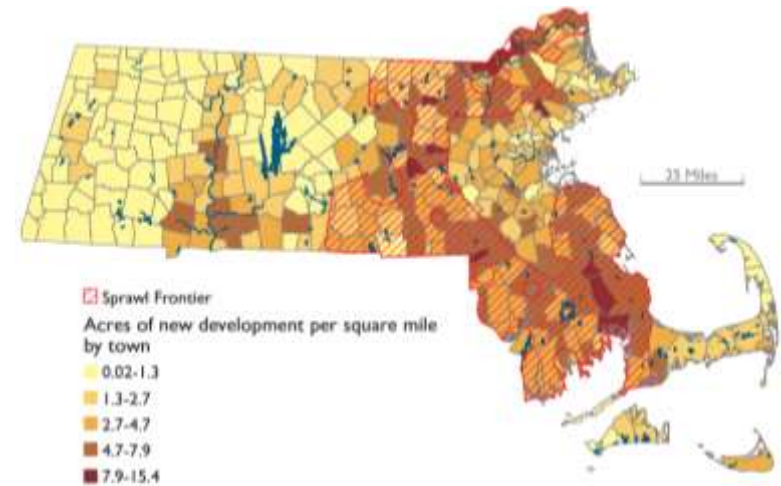
Stefanie Covino [scovino@massaudubon.org](mailto:scovino@massaudubon.org)

Coordinator, Shaping the Future of Your Community Program - Mass Audubon



# Shaping the Future of Your Community

- Created in 2009 in response to *Losing Ground*
- Help the fastest-developing communities chart a more **sustainable future** through customized community workshops and direct assistance



Shaping  
the Future  
of Your  
Community



# Outline for our Webinar

## **1. Low Impact Development (LID) 101**

Laying the ground for climate-smart, nature based solutions

## **2. The power of bylaws and why to review them**

Plan for the community you want to have with smart regulations

## **3. Reviewing bylaws & regs and what's next**

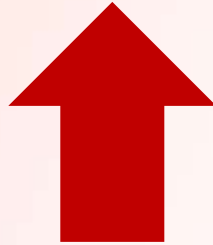
How to use the framework to review local regs

## **4. Q&A**

You can type questions throughout the webinar

# Our climate is already changing

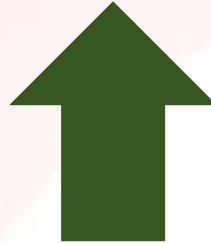
**Temperature:**



**2.9°F**

**Since 1895**

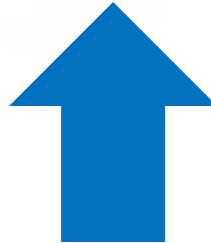
**Growing Season:**



**11 Days**

**Since 1950**

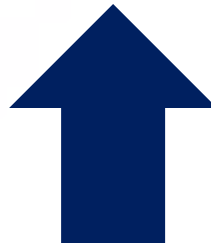
**Sea Level Rise:**



**11 inches**

**Since 1922**

**Strong Storms:**

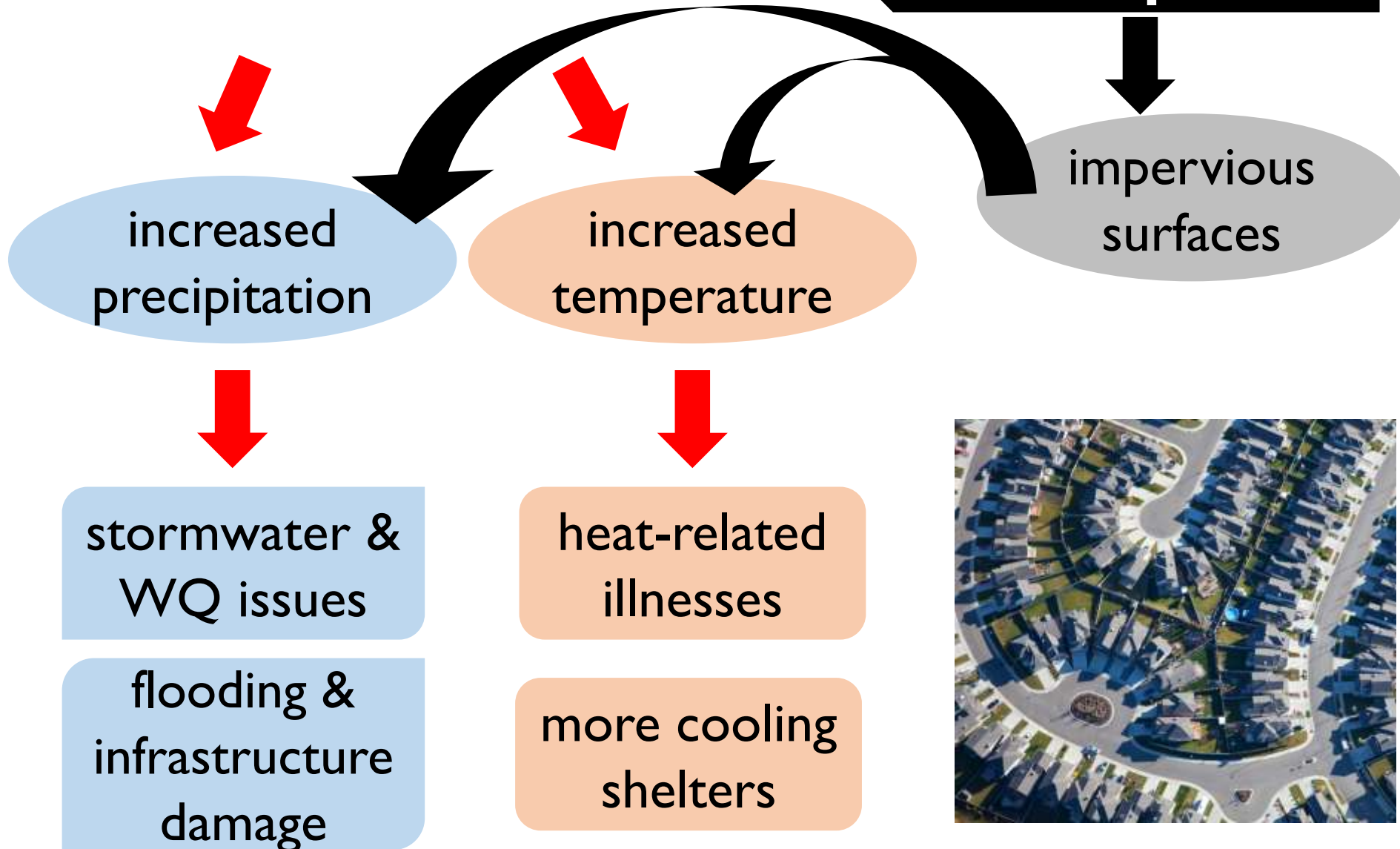


**55%**

**Since 1958**

**Climate change**

**Sprawling  
Development**

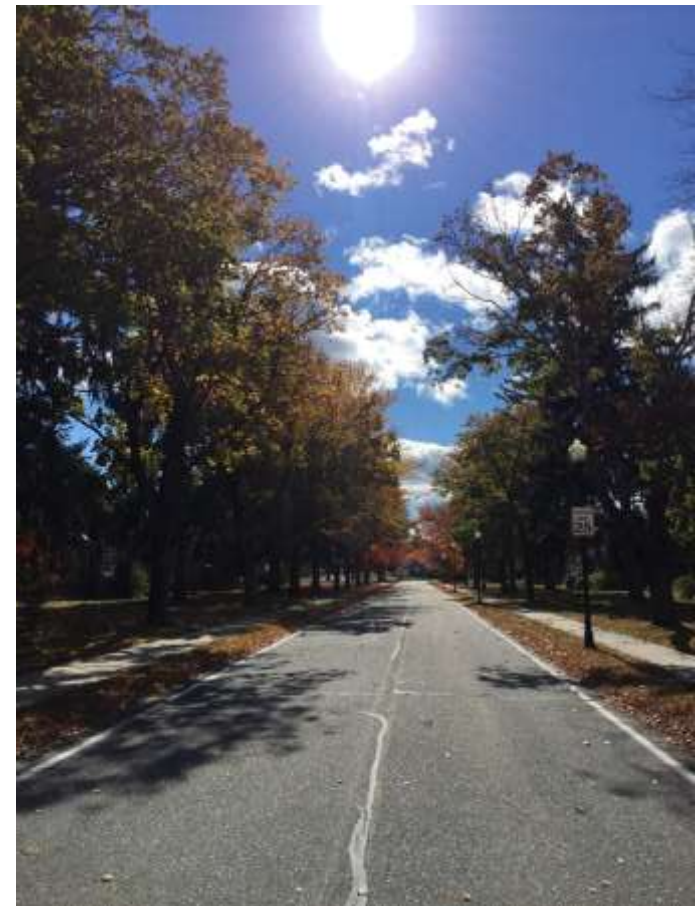




# You get what you zone for

Communities often **unintentionally discourage** climate-smart development by...

- Requiring large lots
- Requiring strict dimensional requirements
- Prohibiting curb cuts for drainage
- Requiring wide, curbed roads
- Requiring invasive species
- Not prioritizing LID
- Not prioritizing preservation of natural features



# Avoid sprawl through climate-smart zoning and regulations

1. Protect natural resources and open space
2. Promote efficient, compact development patterns and infill
3. Smart designs that reduce overall imperviousness
4. Adopt GI Stormwater management provisions (LID)
5. Encourage efficient parking

Factors	Conventional	Better	Best
Curbing	Curbing required full length both sides of road	Allow curb breaks or curb flut with pavement to enable water to flow to vegetated LID features	Open drainage with roadside vees and no curbs preferred
Roadside Swales	Allowed as an option	Preferred over closed drainage	Preferred, with criteria for proper design.
Utilities	Off sets required contributing to wide road R/W's	Not specified, flexible	Allow under road, sidewalks or immediately adjacent to roads to enable placement of roadside vees.
Sidewalks	Concrete or bituminous	Some flexibility in material and design	Prefer permeable pavement
Sidewalks	Required both sides of road	Allow on only 1 side of road especially in low density neighborhoods	Prefer strip with land contours and for best pedestrian utility (e.g. connect with common areas and shared open space) – not necessarily immediately parallel to road.
Sidewalks	Drains to road closed drainage system	Not addressed	Disconnect drainage from road system – e.g. adjacent green strips or within vegetated areas that can absorb sheet flow



# Preserving natural features offers numerous benefits

Every **\$1 invested** in land conservation offers a **\$4 Return** through:

- **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

# Balancing conservation and development via OSRD

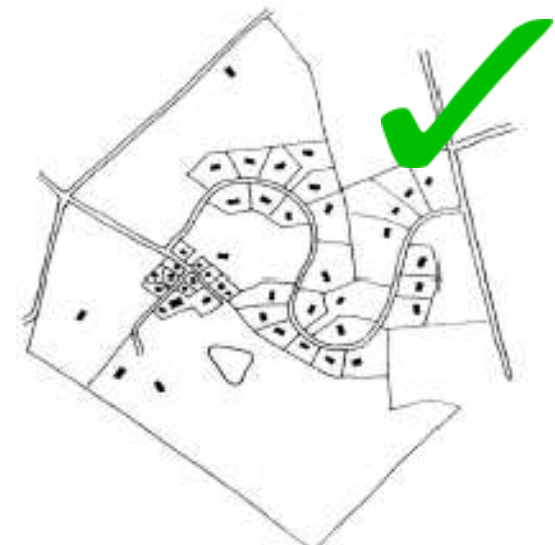
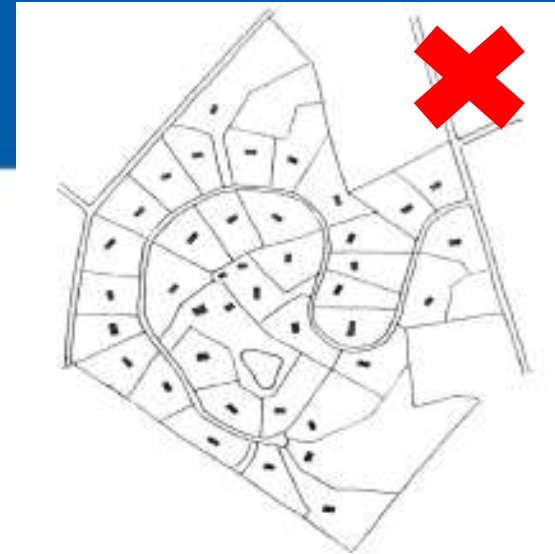
Open Space Residential Design (OSRD);  
Natural Resource Protection Zoning (NRPZ);  
Conservation Design; cluster development





# How to design OSRD

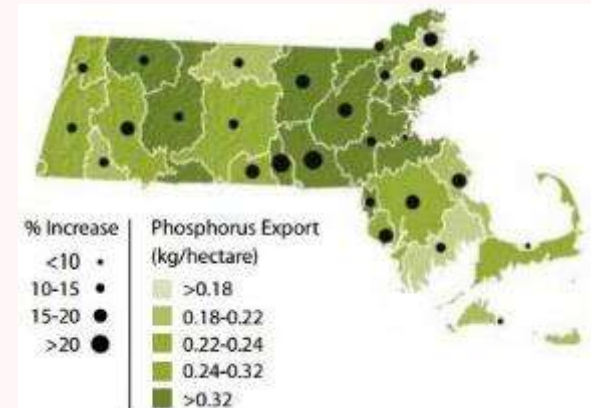
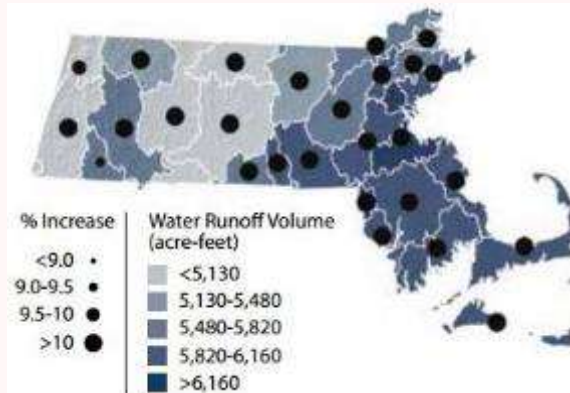
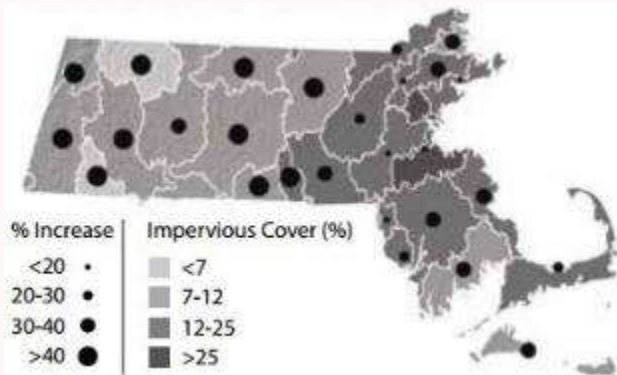
- 1. Calculate** the traditional amount of allowed lots (removing unsuitable building areas, including wetlands)
- 2. Identify** significant natural, cultural, or historic features
- 3. Concentrate** development away from these features through flexible requirements to achieve a similar amount of lots
- 4. Preserve** permanently at least half of the land, whether for natural, agricultural, or forest use



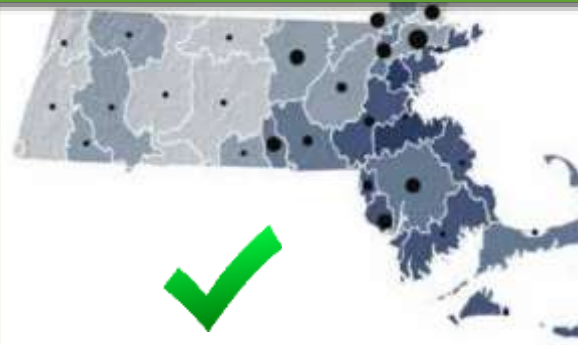
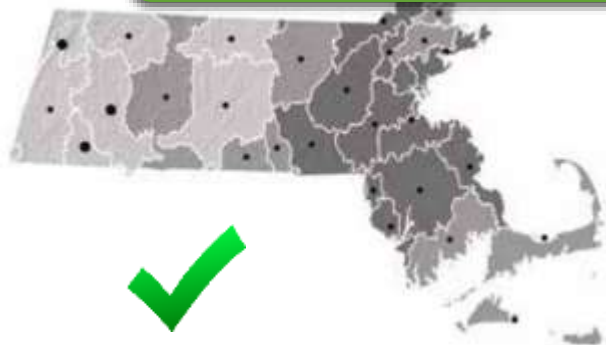
# If we all had OSRD... nutrients, impervious, phosphorus

Source: Harvard Forest Changes to the Land 2014

If we continue to follow opportunistic growth, in 2060:



These allow for nearly the **same amount of development**,  
but 2/3 of it is **clustered** development



# Site-specific solutions via Low Impact Development



















“ LID is an approach to land development (or re-development) that **works with nature to manage stormwater** as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that **treat stormwater as a resource** rather than a waste product. ”

- EPA



Source: Whole Buildings Design Guide, wbdg.com

# Options & benefits of LID

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO <sub>2</sub>	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice																		
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◐	●	◐	◐	●	●
Tree Planting	●	●	●	●	○	◐	○	●	●	●	●	●	●	●	●	◐	●	●
Bioretention & Infiltration	●	●	●	●	◐	◐	○	○	●	●	●	●	●	◐	◐	○	●	●
Permeable Pavement	●	●	●	●	○	◐	●	◐	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◐	○	◐	◐	◐	○	○	○	○	○	○	○	●



Yes



Maybe



No

Source: Center for Neighborhood Technology's The Value of Green Infrastructure



# Examples of GI & LID and how to get there

**Conserve** the natural green infrastructure already providing free ecosystem services

**Integrate** LID and green infrastructure design into development

**Restore** the resiliency of urban landscapes through LID in redevelopment



conserve



restore



protect



save money

# Conserve

**Conserve** the natural green infrastructure already providing free ecosystem services

**Integrate** LID and green infrastructure designs into current development projects

**Restore** the resiliency of urban landscapes through LID in redevelopment



# Integrate

**Conserve** the natural green infrastructure already providing free ecosystem services

**Integrate** LID and green infrastructure designs into current development projects

**Restore** the resiliency of urban landscapes through LID in redevelopment



Narrow, curbless  
roads



Allow curb cuts  
for bioretention

Minimum site  
disturbance;  
preservation of  
trees





# Restore

**Conserve** the natural green infrastructure already providing free ecosystem services

**Integrate** LID and green infrastructure designs into current development projects

**Restore** the resiliency of urban landscapes through LID in redevelopment



Underground  
utilities, tree  
box filters  
between road  
and sidewalk

Curb cut for  
bioswales;  
vegetation  
between road  
and sidewalk



North Street, Pittsfield, MA



# MVP Example: identified intersection that floods?



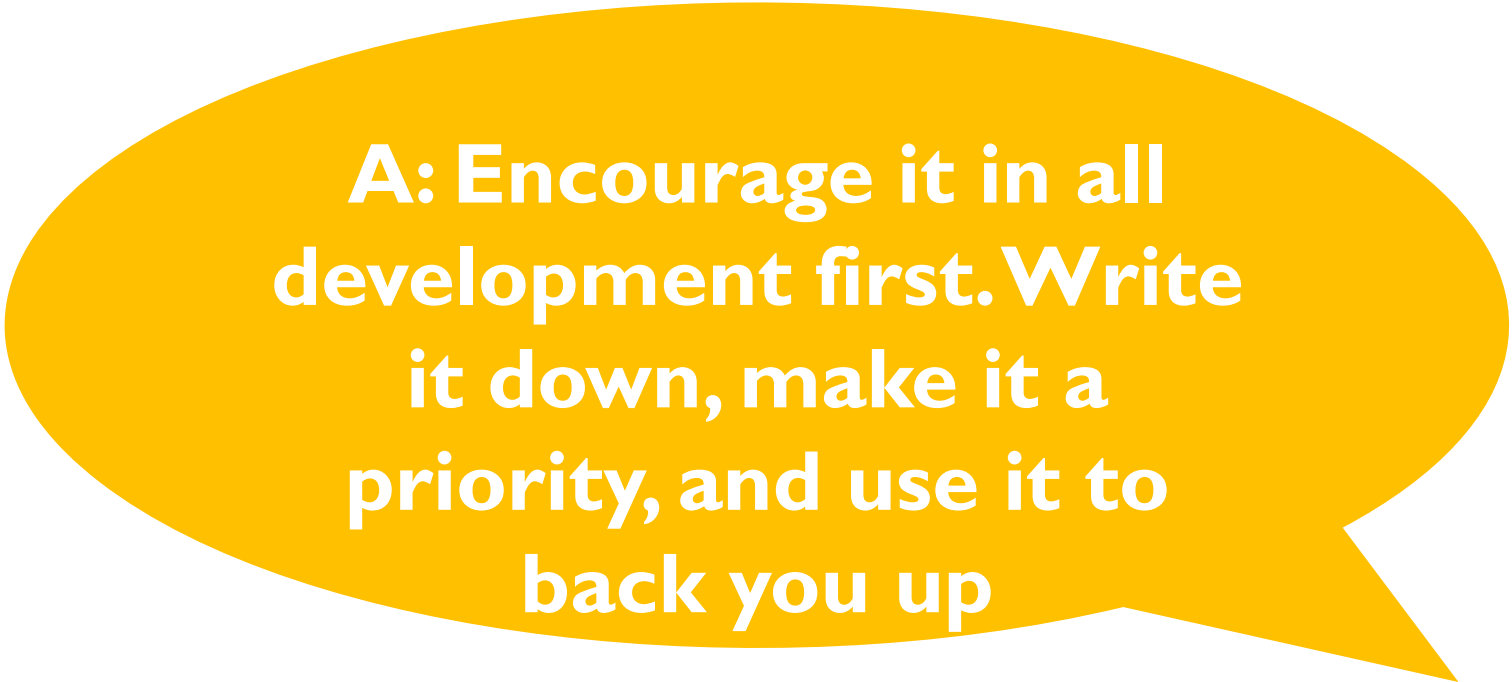
Bioretention bump outs & street trees can help to...

- capture & filter excess water – alleviate pressure on MS4
- improved pedestrian safety – better visibility, shorter walkway
- enhance aesthetics to encourage visitors & walking

without altering existing parking or bus stops



**Q: But how do we  
encourage this in  
redevelopment?**



**A: Encourage it in all  
development first. Write  
it down, make it a  
priority, and use it to  
back you up**

# Climate smart is budget smart

## Reduced clearing & grading costs

- A 20-unit development with two-acre lots requires 40 acres to be cleared and graded
- Conservation subdivisions offer the same amount of housing but preserve 50% of land – and \$200,000+



The more  
land you save,  
the more  
**money** you  
save.

# Climate smart is budget smart

## Reduced paving costs

### Road Diets

Narrowing just 2 miles of road by 4 feet/lane saves



**\$ 500,000 \$**

Plus savings on repair, salting, plowing...

Not building the road through a sprawling development in the first place? Savings grow to the *millions*.



# The power of a bylaw: Westford

- Adopted a Conservation Design bylaw in 1978
- Requires developers to submit both conservation and conventional & Planning Board chooses preferred
- Over 48 developments protected over 1,700 acres of land



# The power of a bylaw: Westford

- Preserved local habitat
- Protected water resources
- Created 13 miles of hiking trails & public recreation
- Town didn't have to purchase the land themselves, saving millions of dollars



Rail Trail in Westford

# If you forget everything I just said... it's right here.



[massaudubon.org/lidfactsheets](https://massaudubon.org/lidfactsheets)



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# Down to nuts and bolts!

## How to review...

- Zoning
- Subdivision Rules & Regulations
- Site Plan Review
- Stormwater or LID bylaw
- OSRD or cluster bylaw