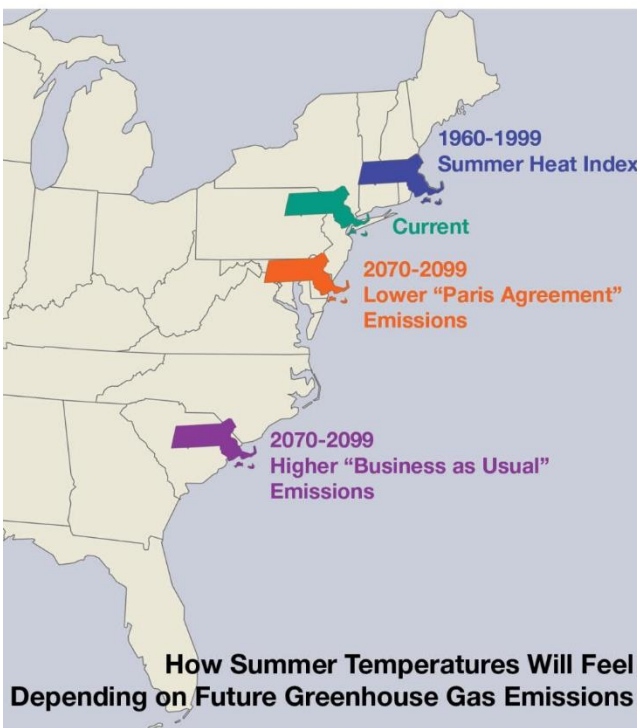


CLIMATE RESILIENCE 101

South Hadley's
CLIMATE is
CHANGING...

- ↑ Rainfall Intensity
- ↑ Total Precipitation
- ↑ Temperature Extremes
- ↑ Risk to People, Environment, and Infrastructure

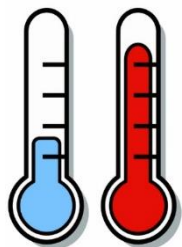


As time goes on, South Hadley's climate will begin to look more like the climate in the mid-Atlantic. By the end of the century, our climate here in Western Massachusetts will feel like North Carolina.

- South Hadley is taking proactive steps to protect its residents and Town infrastructure.
- Through MVP funding from the Executive Office of Energy and Environmental Affairs, the Town conducted an assessment of all of its culverts and bridges – places where Town roadways cross over streams.
- Culverts and bridges can be failure points in heavy precipitation events if they are structurally deficient, have risk factors that may cause them to become clogged, or if they are simply too small to accommodate the larger volumes of water that come along with these storms.
- If a culvert or bridge fails, the road can be washed out and become impassable.



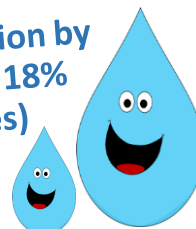
- Flood waters can also back up behind a culvert, causing flooding of the road or of adjacent properties.
- South Hadley now has a list of priority culvert replacement projects to improve resilience and prevent flooding.



26 days of extremely hot weather over 90°F
—nearly a month each year—in the 2030s

12 weeks (basically a whole summer)
over 90°F by the end of the century

Up to an 11% increase in annual precipitation by 2030 (5 additional inches of rain) and an 18% increase by 2090 (8.3 additional inches)



A shorter, milder winter, with a month fewer days under freezing by the 2030s and two months fewer days below freezing by the 2090s



FUSS & O'NEILL

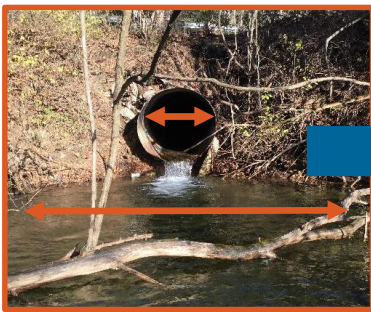


NATURE-BASED Solutions

1. "RIGHT-SIZING" CULVERTS is a key Nature-Based Solution



- ↓ Risk of Flooding
- ↓ Maintenance Effort
- ↑ Habitat Connectivity
- ↑ Aquatic Organism Passage
- ↑ Water Quality

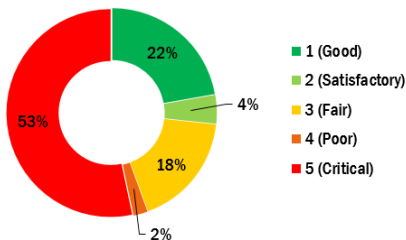


- Too narrow to safely pass water from large rain events
- Freefall at outfall causes erosion and restricts fish movement upstream
- Right-sized culvert spans full stream and banks
- Allows water and storm debris to pass with no flooding or clogs
- Fish can swim easily upstream and small animals can cross under the roadway

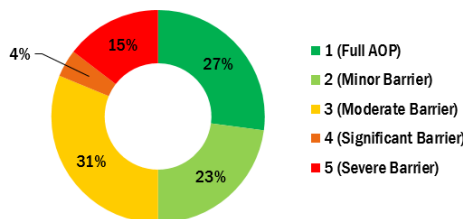
More than 25,000 culverts across Massachusetts are in need of replacement. In South Hadley:

- 50% of culverts are undersized to pass smaller storms as well as rarer, large storm events
- 50% of culverts have structural deficiencies
- 20% of culverts block access to upstream habitat

Structural Condition Ratings



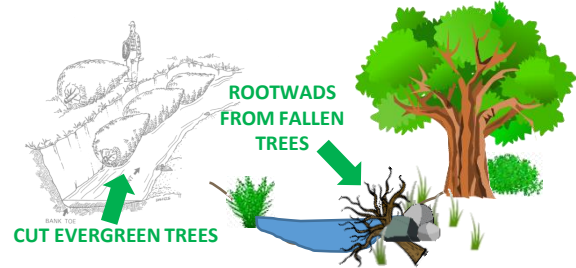
Aquatic Organism Passage (AOP) Classifications



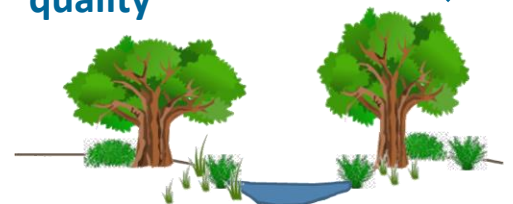
Nature-Based Solutions (NBS) are adaptation measures focused on the **PROTECTION, RESTORATION, and/or MANAGEMENT** of ecosystems to safeguard public health, provide clean air and water, and increase climate resilience. Using NBS in local projects produces long-term solutions that benefit humans and nature.

2. STABILIZING STREAM BANKS prevents erosion and storm damage

Natural woody materials anchor soil in place and help to accumulate and hold new bank material over time



3. CONSERVATION of RIPARIAN AREAS and buffer zones reduces runoff, provides shade, and protects water quality



- Plant native trees and shrubs along streams and in wetland buffer zones
- Contact South Hadley Conservation Commission before doing any work near streams or wetlands