Impervious Surfaces in Southborough

An overview of the final deliverable of an Impervious Surfaces Data Layer

Presented by: Melissa Danza, Conservation Agent
Funded by: MVP Action Grant

Agenda

- MVP Program
- Overview of MVP Action Grant
  - Impervious Surfaces Data Layer
- Impervious Surfaces
  - Effects on Climate Change
- Results of Data Analysis
- Next Steps

Municipal Vulnerability Preparedness Program

- MVP Program
- September 2020 – designated as MVP Community
  - Completed Community Resilience Building planning process
  - Funded through MVP Planning Grant & staff hours
  - Requires annual yearly progress reports
- Provides support for cities and towns to identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change
- Required a meeting with community stakeholders
  - Board/committee members, local businesses, utility companies, builders, MWRA, DCR, schools, land trusts
  - Identified top hazards, vulnerabilities, and areas of concerns
  - Provided top recommendations to increase resilience
- Funded update of Local Hazard Mitigation Plan
- Summary of Findings found on Conservation Commission website

MVP
Municipal Vulnerability Preparedness

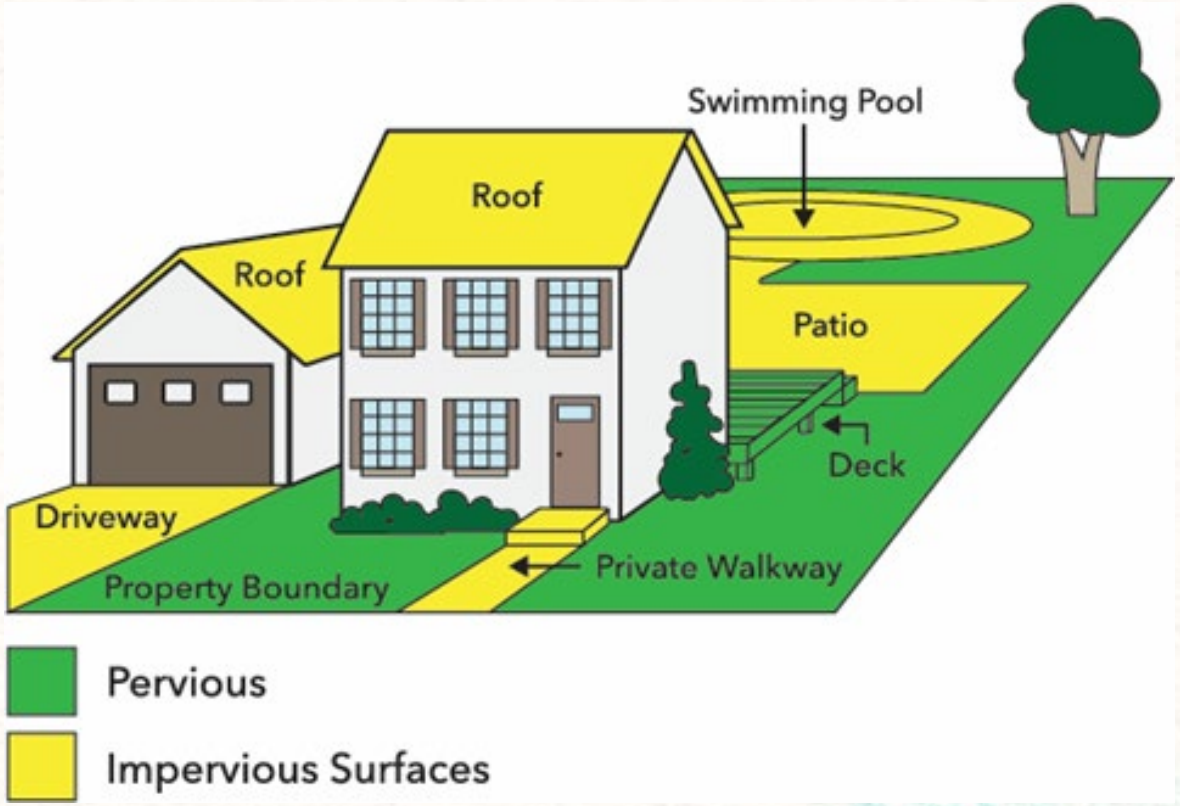
MVP Action Grant

- To implement priority climate adaptation actions identified by the community
- Preference for nature based solutions
- Eligible projects: vulnerability & risk assessment, education & outreach, local bylaw updates, redesign & retrofit, energy resilience strategies, chemical safety & climate vulnerabilities, nature based hazard reductions, acquisition of land, ecological restoration and habitat management to increase resiliency
- Application submitted – May 2021
- Grant received – July 2021
- Impervious Surfaces Data Layer
  - Create outline of all impervious surfaces within Southborough
  - Ability to determine sf per parcel
  - GIS data layer
- Will help to understand links between water quality/health and impervious surfaces around the Reservoir
- Be able to determine areas for potential improvement and/or reduction

What Are Impervious Surfaces?

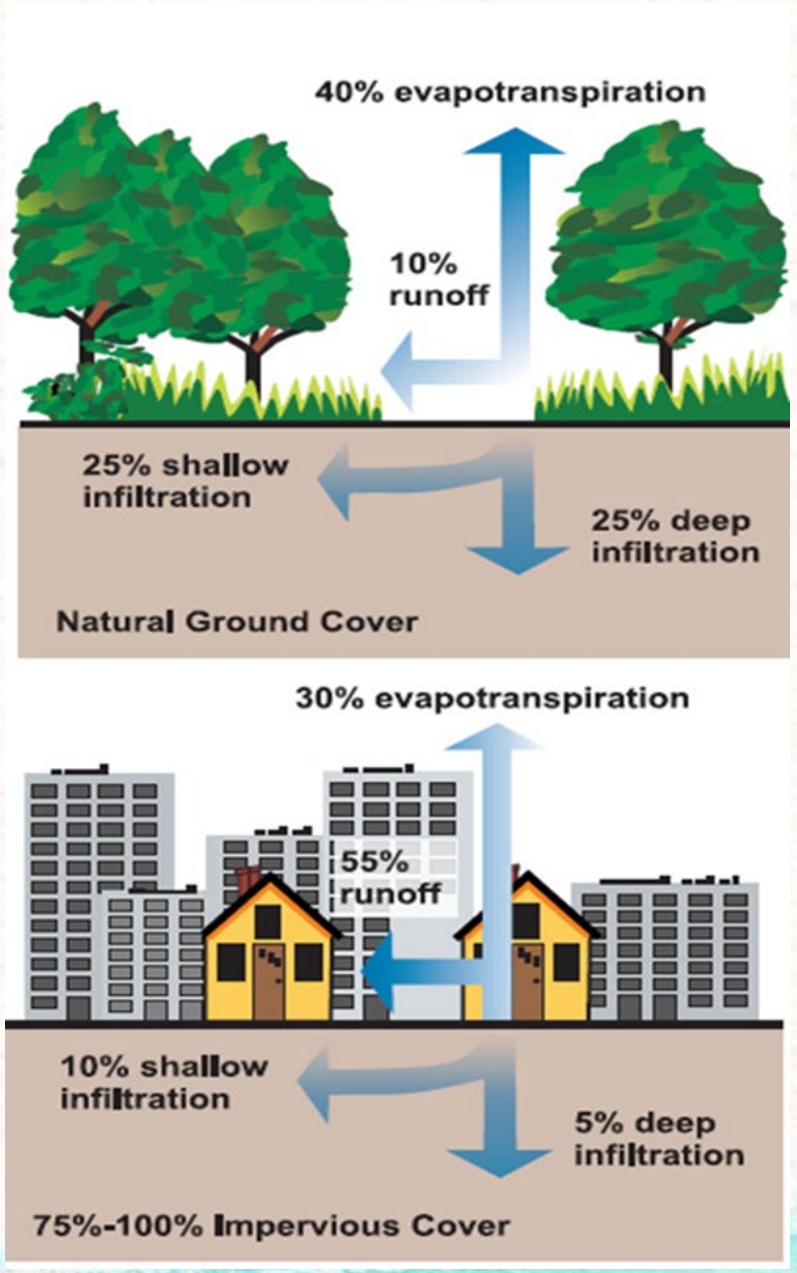
Impervious Surfaces refer to hard surfaces that do not allow water to seep into the ground

- Driveways
- Parking Lots
- Roofs
- Sheds
- Roads
- Sidewalks
- Pavers, walkways, etc (cemented together)
- Compacted gravel
- Solid decks



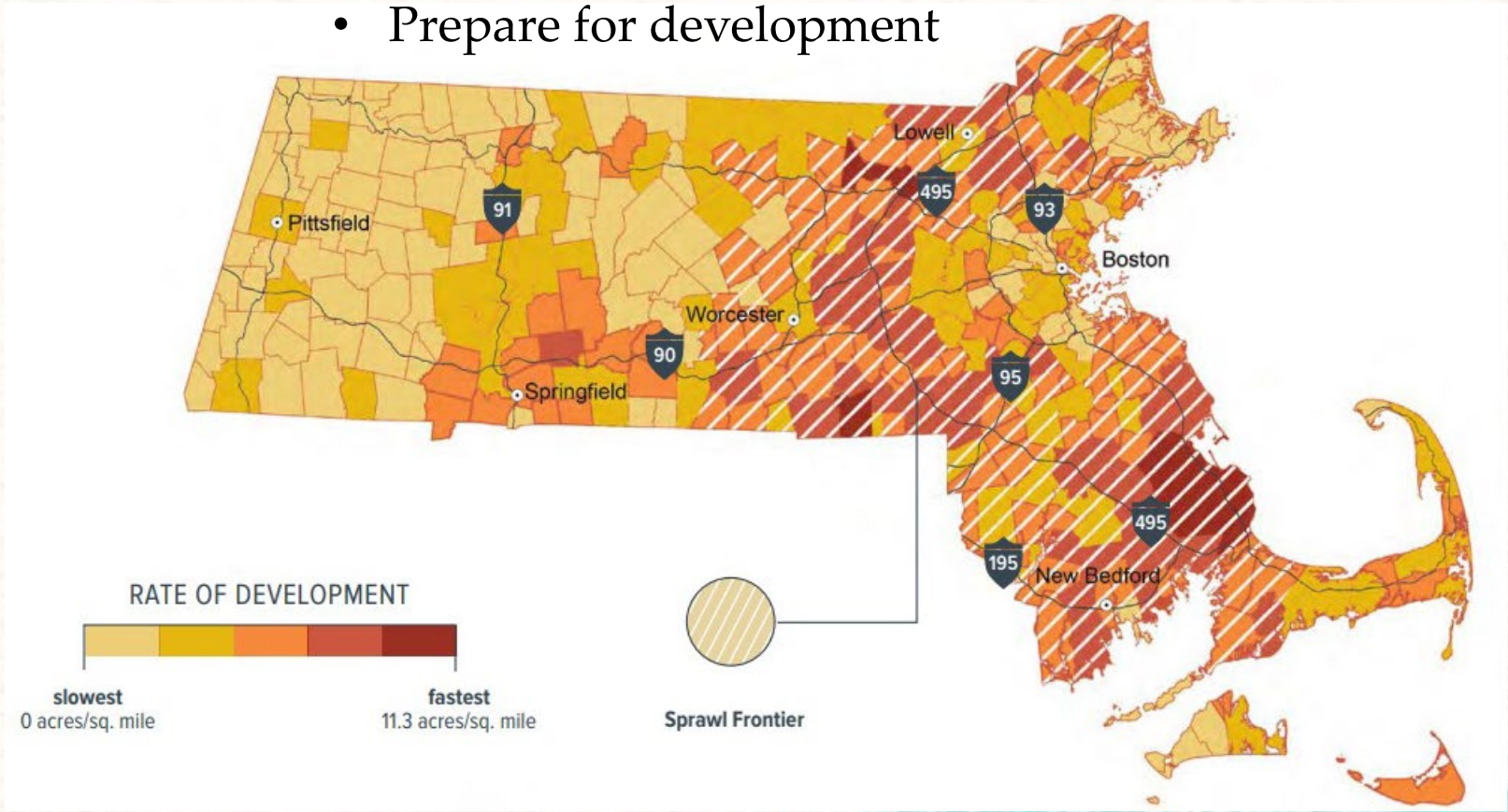
Increased Impervious Surfaces are Intensifying Climate Change

- Decreases water quality and ecological health
  - Contaminants are often 'caught' on paved surfaces and directly discharged to waterbodies
- Hold and store heat
  - Increased surficial heating → increased localized temperatures
  - Increased surficial heating → warmer stormwater → warmer adjacent waterbodies
- Decreased groundwater recharge
  - Less stormwater infiltrating into the ground
  - Increasing rainfall amounts + decreased recharge = localized flooding



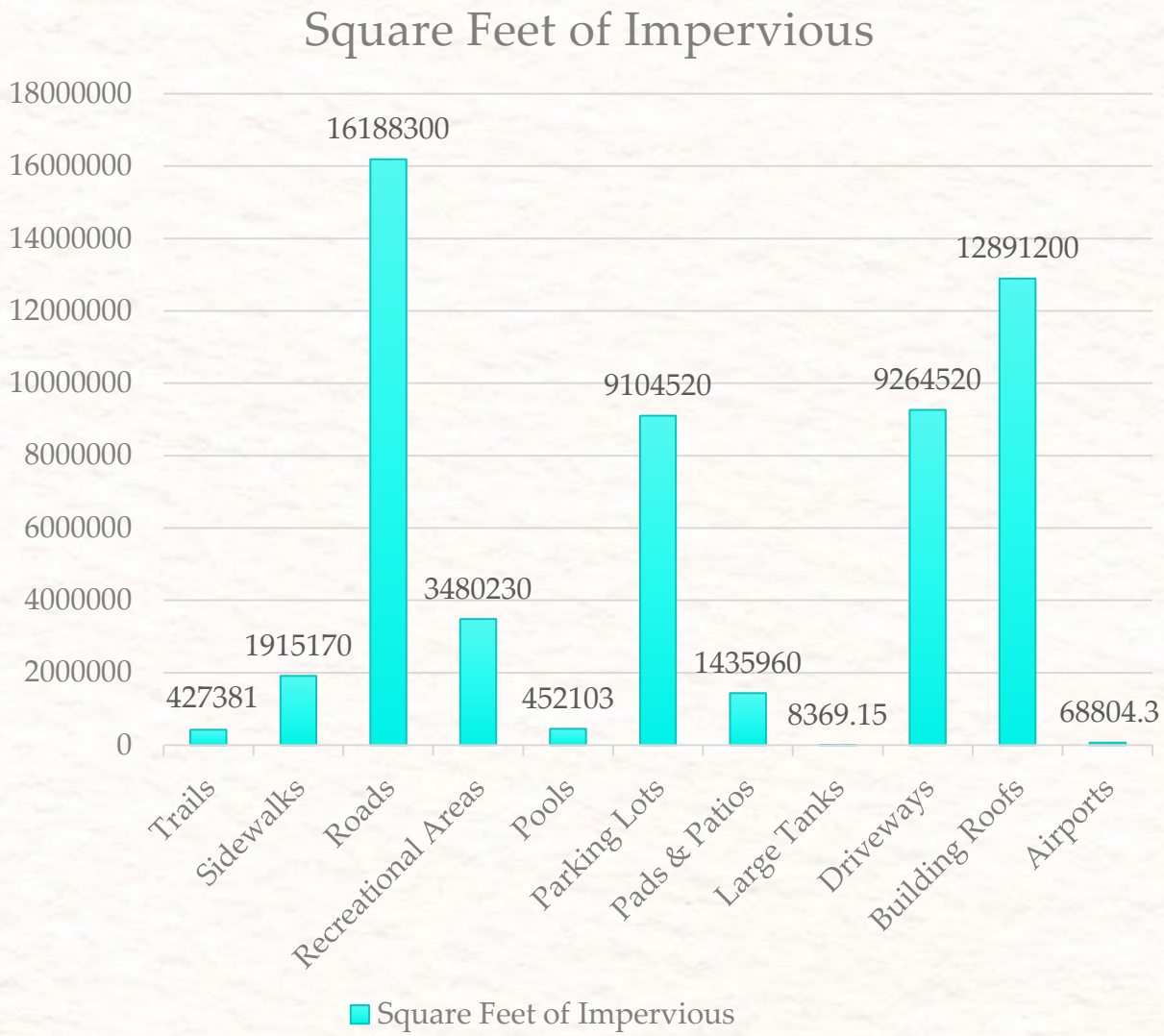
Why Did We Want This Information?

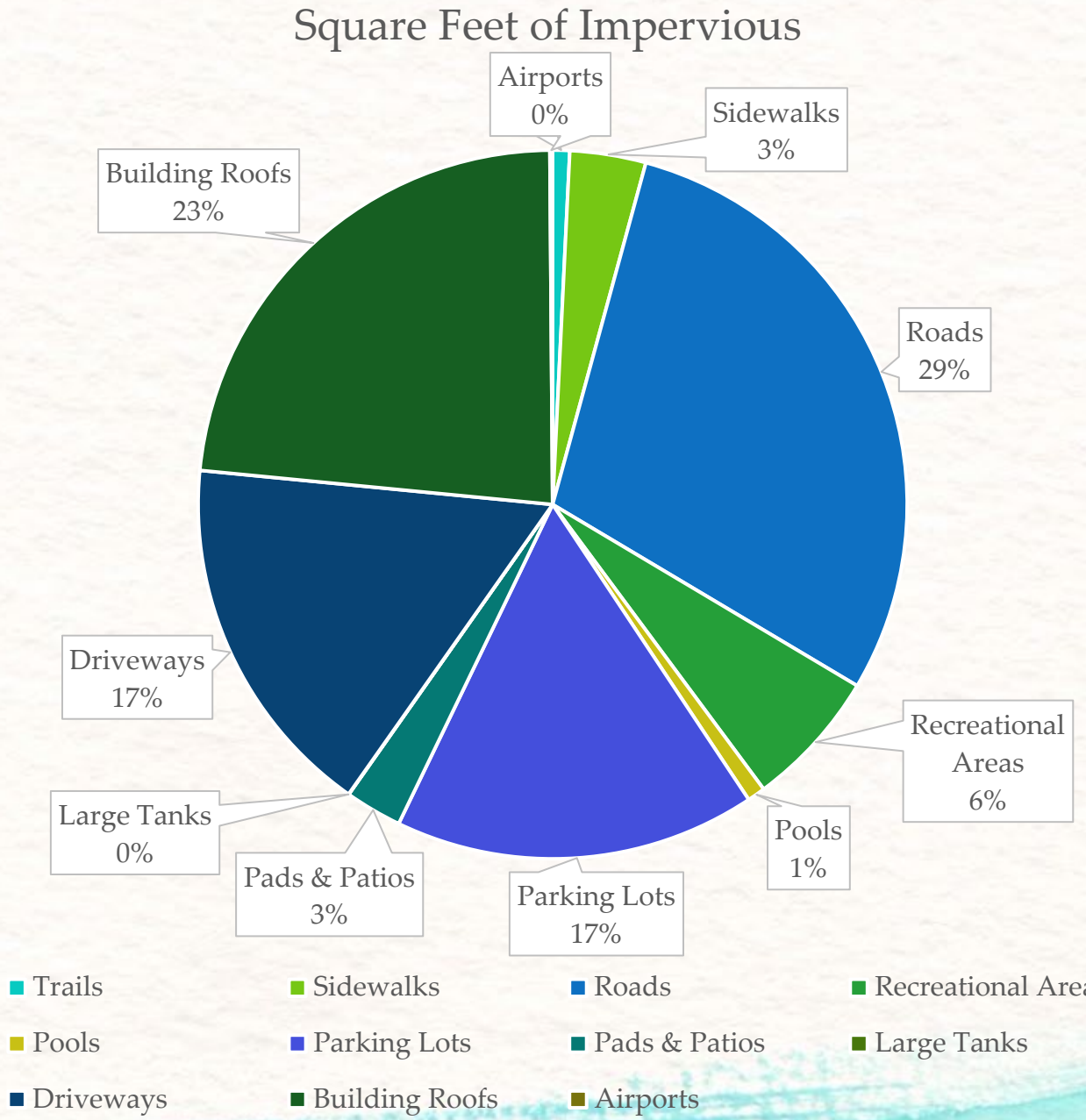
- Understand amount of impervious within Southborough
- Determine statistical data (average, minimum, maximum)
- Understand impacts to stormwater
  - Begin to consider implications under MS4 permit (costs)
- Determine any clustering around wetland resources
- Determine if greater efforts are needed to reduce impervious surfaces
- Understand impacts to Sudbury Reservoir and aquatic health
- Prepare for development



Results

- Outlined impervious surfaces
  - Trails
  - Sidewalks
  - Roads
  - Recreational Areas
  - Pools
  - Parking Lots
  - Pads & Patios
  - Large Tanks
  - Driveways
  - Building Roofs
  - Airports


Square Feet of Impervious
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
427381
1915170
16188300
3480230
452103
9104520
1435960
8369.15
9264520
12891200
68804.3
Trails
Sidewalks
Roads
Recreational Areas
Pools
Parking Lots
Pads & Patios
Large Tanks
Driveways
Building Roofs
Airports
Square Feet of Impervious

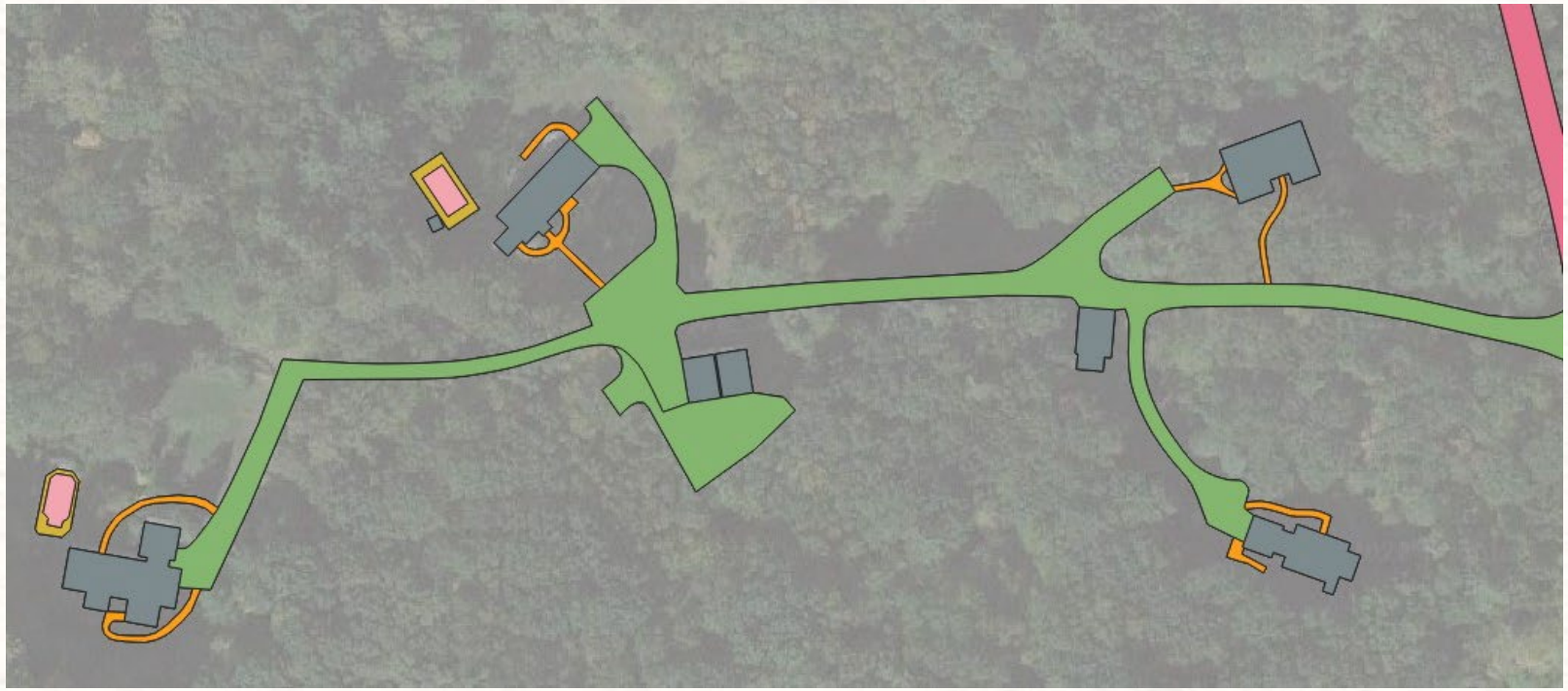

Square Feet of Impervious
Airports 0%
Sidewalks 3%
Building Roofs 23%
Roads 29%
Driveways 17%
Recreational Areas 6%
Large Tanks 0%
Pads & Patios 3%
Pools 1%
Parking Lots 17%
Trails
Sidewalks
Roads
Recreational Areas
Pools
Parking Lots
Pads & Patios
Large Tanks
Driveways
Building Roofs
Airports

Building Roofs

- Number of Structures: 5,405
- Total: ~1,290,000 square feet
- Minimum: 27 square feet
- Maximum: 340,088 square feet
- Median: 1,673.59 square feet
- Mean: 2,385.05 square feet
- High standard deviation (data spread out)

Driveways

- Total Count: 3,605
- Total Square Feet: 9,260,000
- Minimum: 32.13 square feet
- Maximum: 119,234 square feet
- Median: 1,825.48 square feet
- Mean: 2,569.91 square feet
- High standard deviation (data spread out)

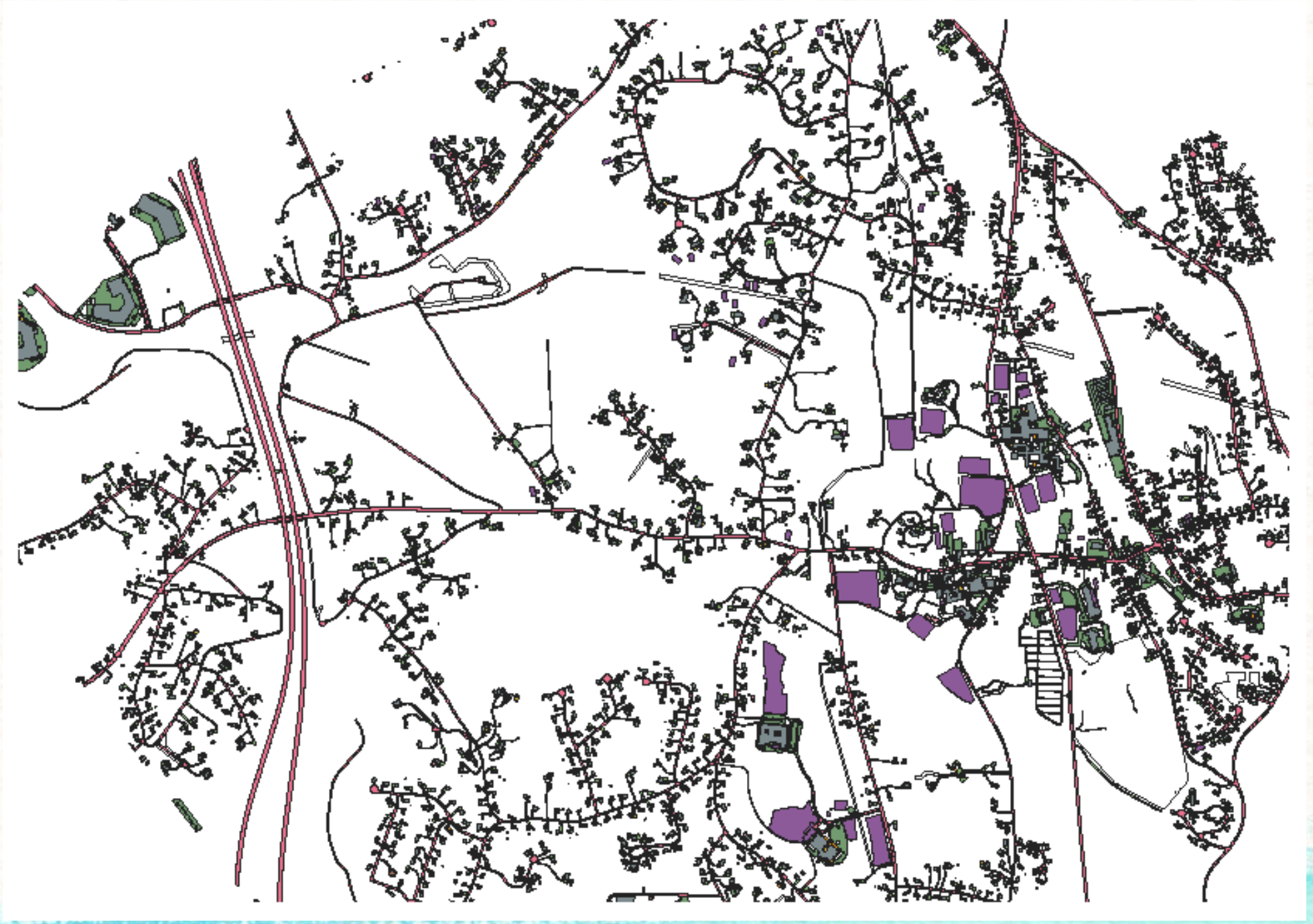


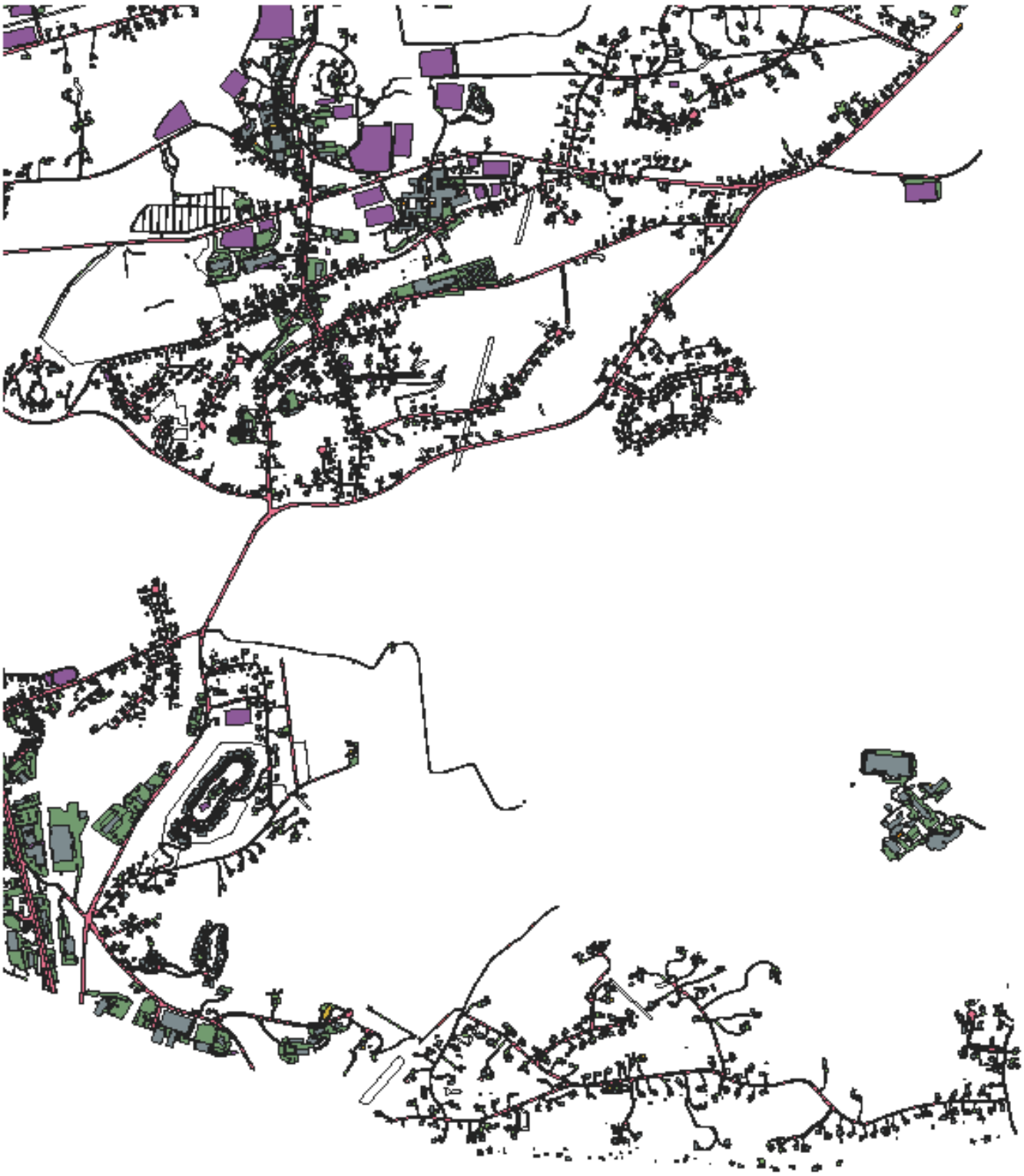
Pads & Patios

- Total Count: 2,240
- Total Square Feet: 1,440,000
- Minimum: 23 square feet
- Maximum: 9029 square feet
- Median: 442.89 square feet
- Mean: 641 square feet
- High standard deviation (data spread out – but not as much as roofs & driveways)

Parking Lots

- Total Count: 291
- Total Square Feet: 9,100,000
- Minimum: 63.87 square feet
- Maximum: 514,433 square feet
- Median: 8,965.96 square feet
- Mean: 2,569.91 square feet
- High standard deviation (data spread out)



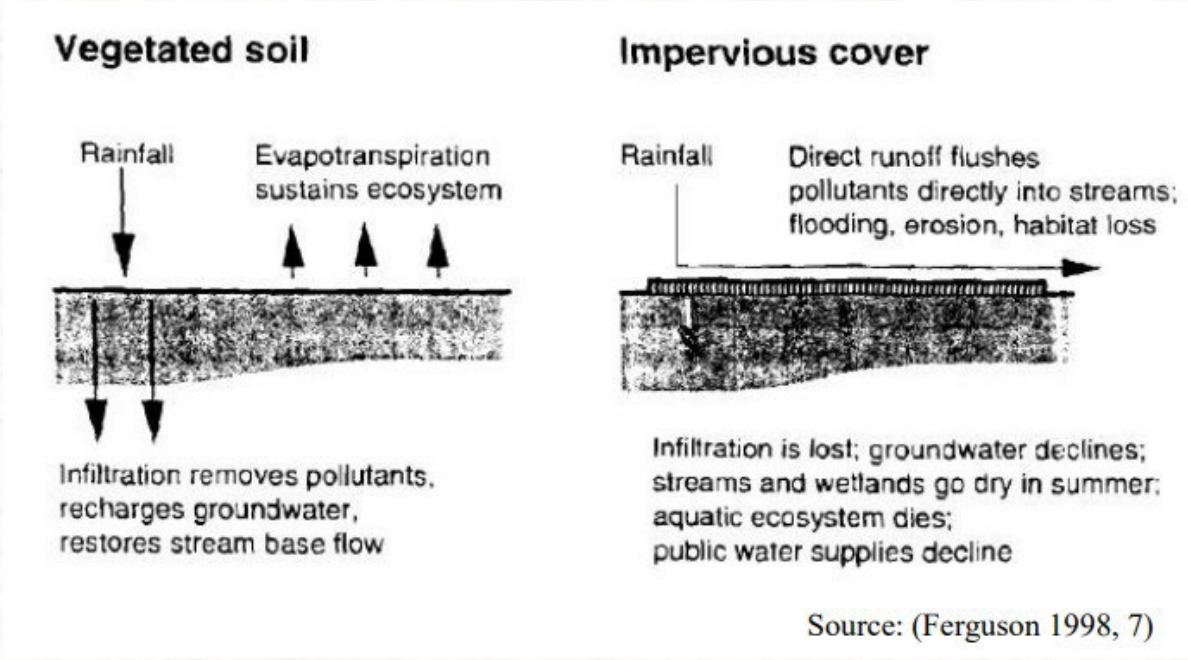


What Does This Mean?

- Total SF of Impervious: 55,236,557.45
  - Acres: ~1,268

- Total Acres in Southborough: 10,048
- Total Acres of Water: 960 (9.5%)
- Total Acres of Land: 9,088

- 14% impervious based on land coverage only
- 12.6% total impervious



Impervious Cover

0–7% 7–12% Over 12%

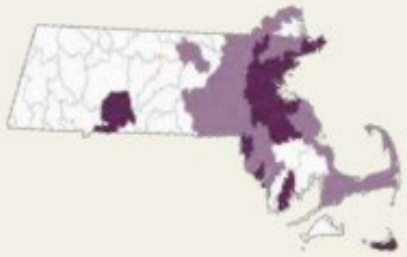
REDUCE IMPERVIOUS SURFACES

Communities' choices in how to plan for and regulate development will drive future outcomes, such as the degree to which forests and other lands can continue to absorb and filter rainwater, as depicted in these two potential futures generated from the Harvard Forest Landscape Futures Scenarios.[42] In addition to exacerbating stormwater and flooding issues, the amount of impervious cover present in the landscape has serious implications for wildlife.

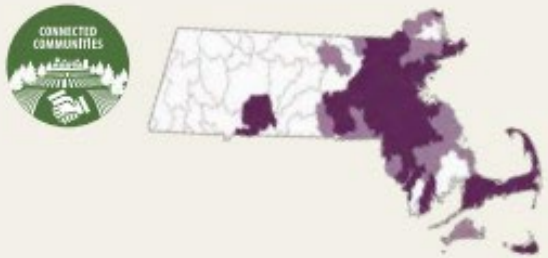
7% IMPERVIOUS COVER →
DECLINE OF RIVER FISH BY APPROXIMATELY 35%.[46]

12% IMPERVIOUS COVER →
FAILURE BY MOST STREAMS to meet water quality standards for aquatic life.[47]

2010 Starting



2060 Connected Communities scenario



2060 Growing Global scenario

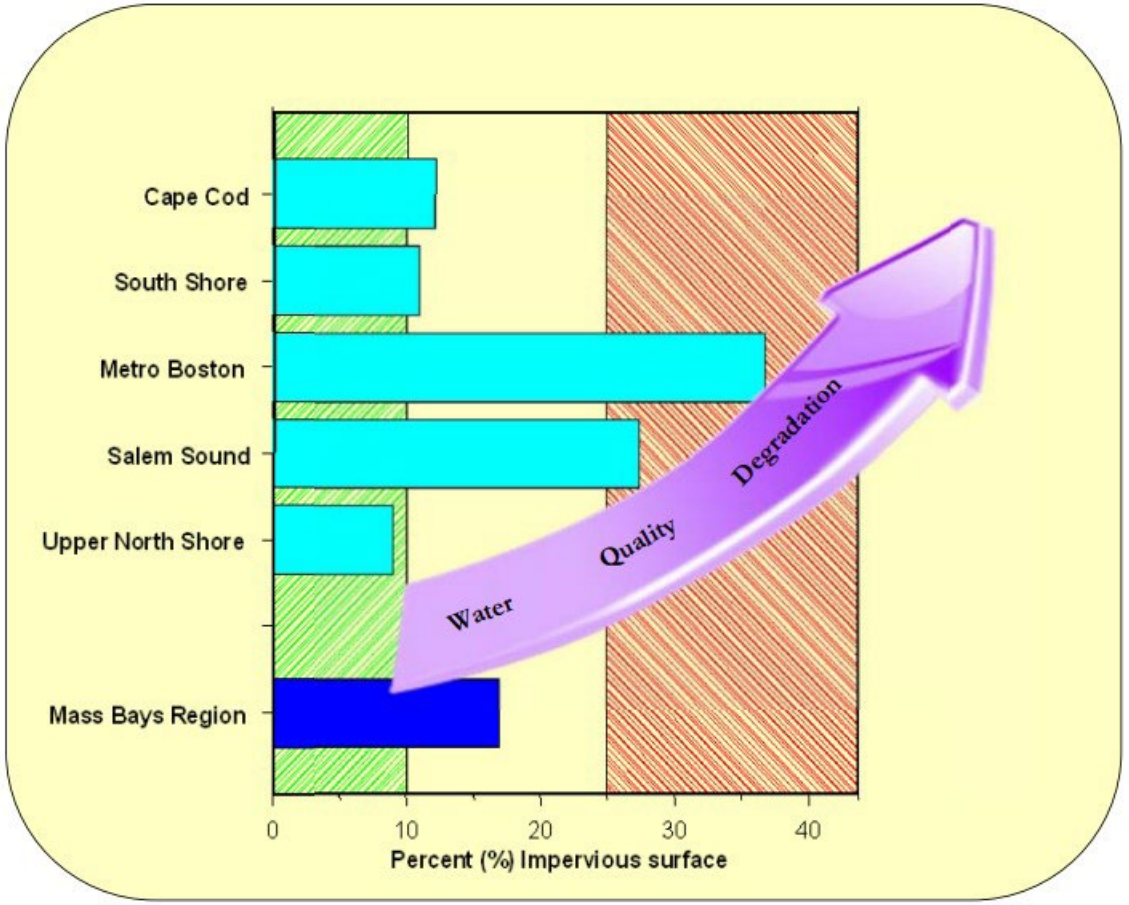


Figure 15.2. Percent Impervious surfaces in the five regions of the Massachusetts Bays Program region. Shading represents water quality thresholds identified by the Center for Watershed Protection. Based on 2005 Data from MassGIS.

Next Steps

- Continue review of data
  - Split out per parcel
  - Determine true average for residential vs commercial
- Review bylaw requirements (parking, LID, etc.) & potential amendments
- Consider Impervious Surfaces Mitigation or Reduction Plan
- Incentivize use of nature based solutions (see previous webinar!)
- Collaborate with local stakeholders for increased education
- Prioritize canopy protection

Questions & Resources

- Contact Melissa Danza for additional questions
  - mdanza@southboroughma.com
  - 508-281-8984

- Other Useful Resources:
  - https://www.southboroughtown.com/conservation-commission
  - https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program
  - https://resilientma.org/mvp/index.html
  - https://www.mass.gov/doc/human-uses-and-planning/download
  - https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf