Green Stormwater Infrastructure
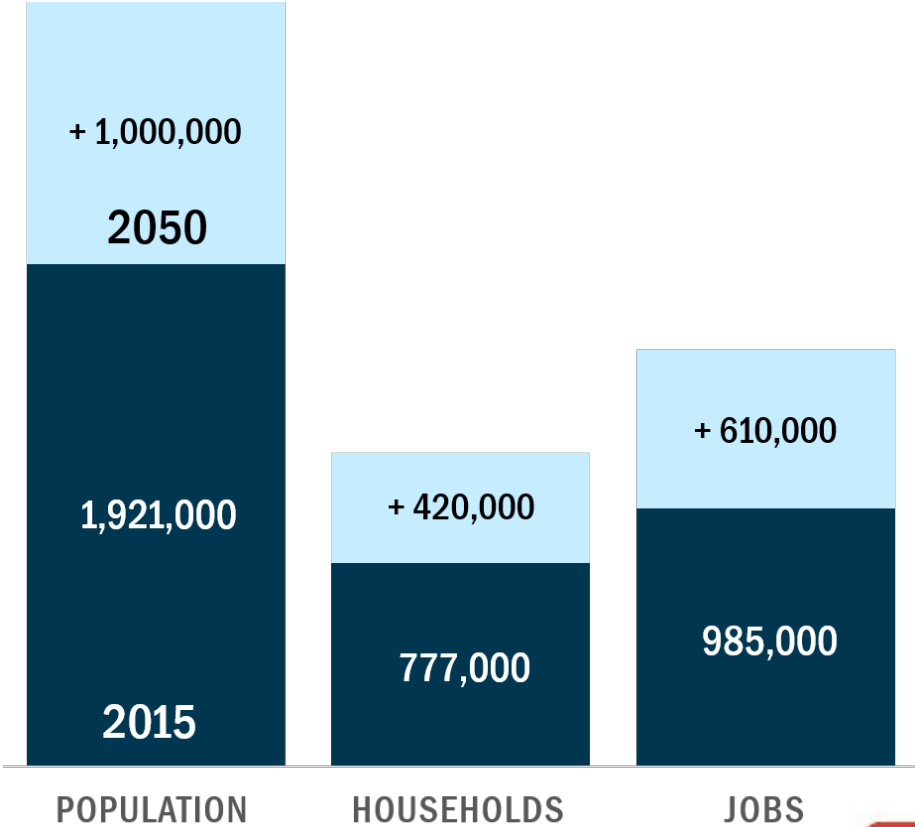
MID-OHIO REGIONAL
MORPC
PLANNING COMMISSION
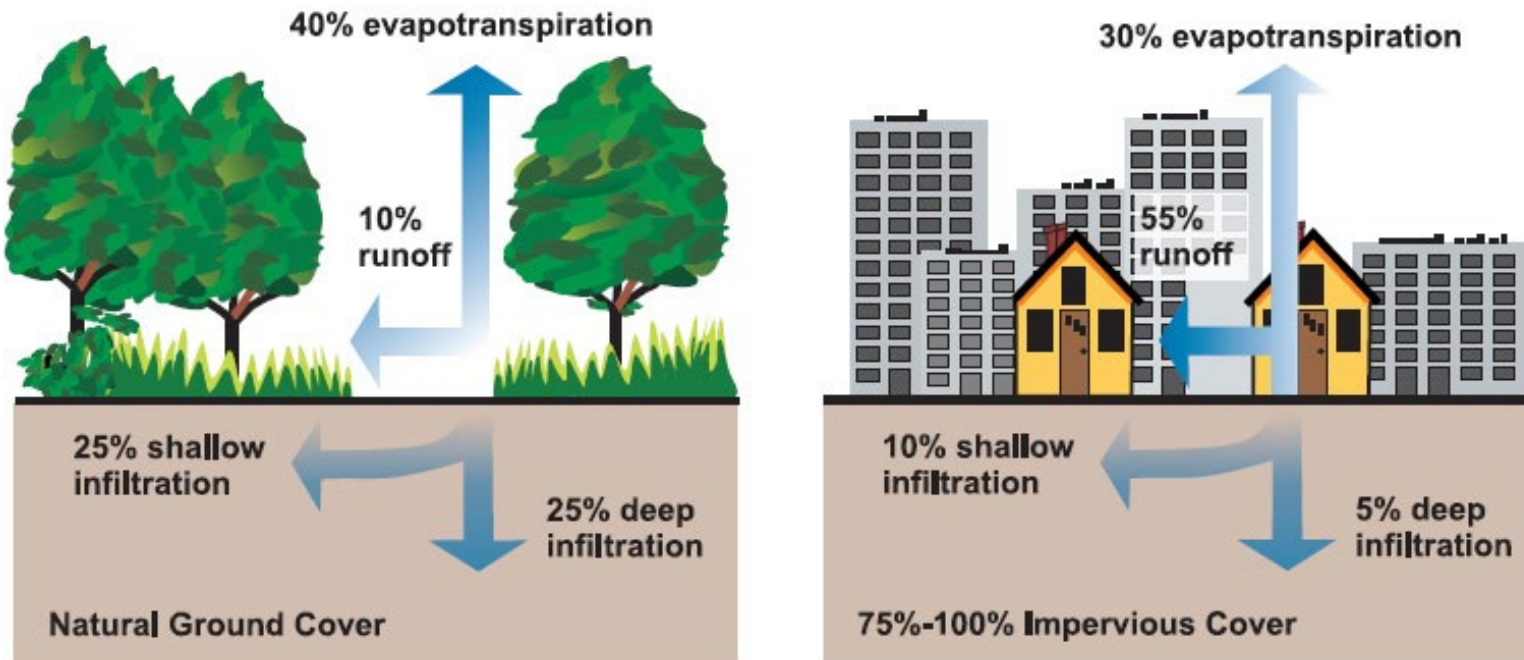
THE REGION IS GROWING...A LOT

MORPC

Union
Delaware
Licking
Franklin
Madison
Fairfield
Pickaway

POPULATION
+ 1,000,000
2050
1,921,000
2015

HOUSEHOLDS
+ 420,000
777,000

JOBS
+ 610,000
985,000

insight 2050

RELATIONSHIP BETWEEN IMPERVIOUS COVER AND SURFACE RUNOFF

Source: U.S. Environmental Protection Agency, Protecting Water Quality from Urban Runoff, p. 1.

# EXAMPLES OF STORMWATER POLLUTANTS TYPICAL OF ROADS

Pollutant	Source	Effects
Trash	--	Physical damage to aquatic animals and fish, release of poisonous substances
Sediment/solids	Construction, unpaved areas	Increased turbidity, increased transport of soil bound pollutants, negative effects on aquatic organisms reproduction and function
Metals • Copper • Zinc • Lead • Arsenic	• Vehicle brake pads • Vehicle tires, motor oil • Vehicle emissions and engines • Vehicle emissions, brake linings, automotive fluids	Toxic to aquatic organisms and can accumulate in sediments and fish tissues
Organics associated with petroleum (e.g., PAHs)	Vehicle emissions, automotive fluids, gas stations	Toxic to aquatic organisms
Nutrients	Vehicle emissions, atmospheric deposition	Promotes eutrophication and depleted dissolved oxygen concentrations

- 20% of U.S. roads are in urban areas
- Roads, sidewalks and parking lots constitute 2/3 of total IC
- Contribute similar runoff ratio

CHANGE IN WEATHER PATTERNS

Observed Change in Very Heavy Precipitation
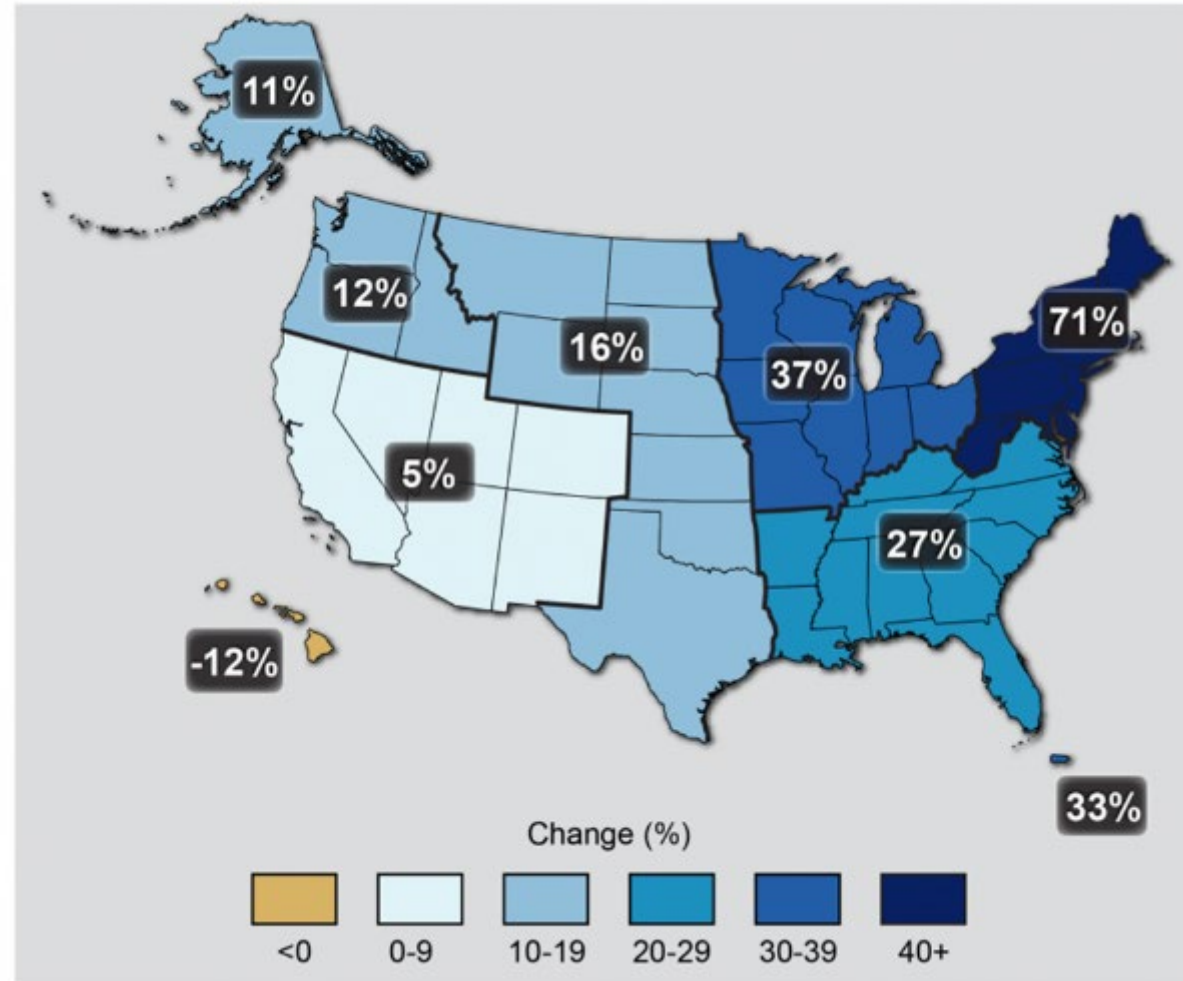
Source: National Climate Assessment, 2014)
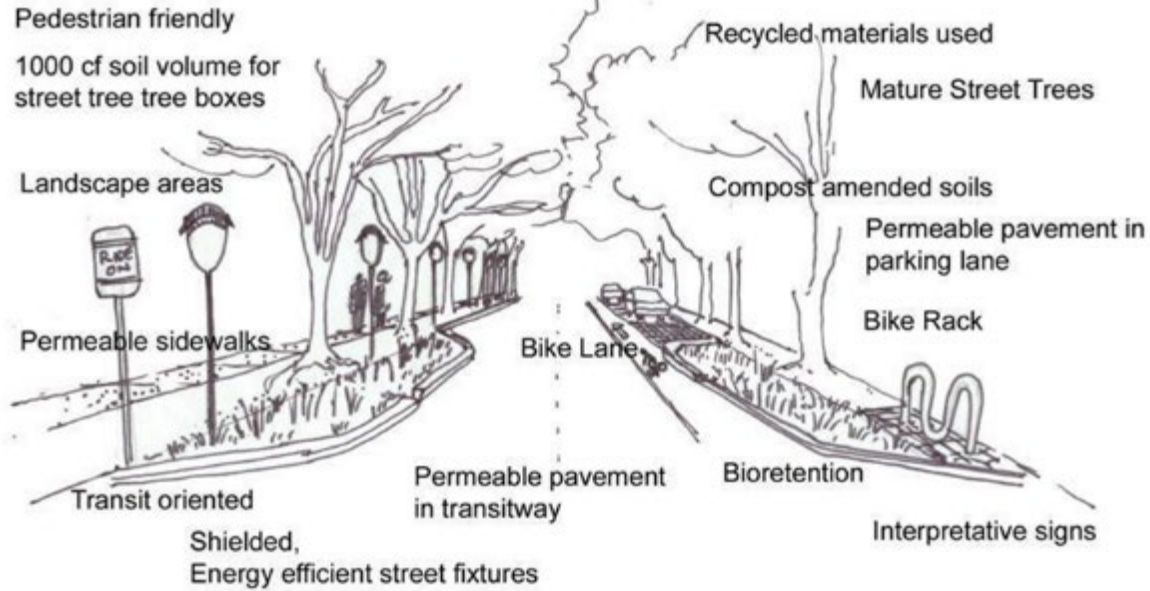
WHAT IS GREEN STORMWATER INFRASTRUCTURE

"Green" stormwater infrastructure is designed to mimic nature and capture rainwater where it falls. Green infrastructure reduces and treats stormwater at its source.

Environmental Protection Agency

COMPLETE STREETS ARE GREEN STREETS

Anatomy of a Green Street

Pedestrian friendly

1000 cf soil volume for street tree tree boxes

Landscape areas

Permeable sidewalks

Transit oriented

Shielded, Energy efficient street fixtures

Permeable pavement in transitway

Bike Lane

Bioretention

Recycled materials used

Mature Street Trees

Compost amended soils

Permeable pavement in parking lane

Bike Rack

Interpretative signs

Source: Environmental Protection Agency, 2019

Source: National Association of City Transportation Officials

BARRIERS TO GSI IMPLEMENTATION

Technical and Physical Barriers

E.g. Lack of understanding and knowledge of what GI is and the benefits it provides

Legal and Regulatory Barriers

E.g. Conflicting codes and ordinances

Financial Barriers

E.g. Inability to afford GI investment

Community and Institutional Barriers

E.g. Public knowledge and perception

CASE STUDIES/ SUCCESS

Chicago Department of Transportation – Green Alley Program

   2001-2017 = ≥ 300 Green Alleys

Green Alleys in Chicago (Source: Abby Hall, US EPA)

*The Chicago Green Alley Handbook

Portland's Green Streets Team
- **Cross Agency and Interdisciplinary team in creating institutional framework**

Examples of Green Street Designs - Swales

Source: Abby Hall, US EPA

- Swales - Benefits
  - Reduce stormwater volume through infiltration
  - Improve water quality through vegetative and soil filtration
  - Reduce flow velocity by increasing channel roughness

Examples cont'd – Bioretention Curb Extensions

Source: Abby Hall, US EPA

- Bioretention Curb Extensions and Sidewalk Planters – Benefits
  - Infiltration and storage reduces runoff volumes and attenuates peak flows
  - Stormwater is filtered through vegetation and soil

Examples cont'd – Permeable Pavement

Source: Abby Hall, US EPA

- Benefits
  - Runoff storage
  - Pollutant removal through filtering and adsorption

Examples cont'd – Sidewalk trees and tree boxes

Source: Abby Hall, US EPA

- Benefits
  - Reduce urban heat island effect
  - Reduce stormwater runoff
  - Improve the urban aesthetic
  - Improve air quality

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