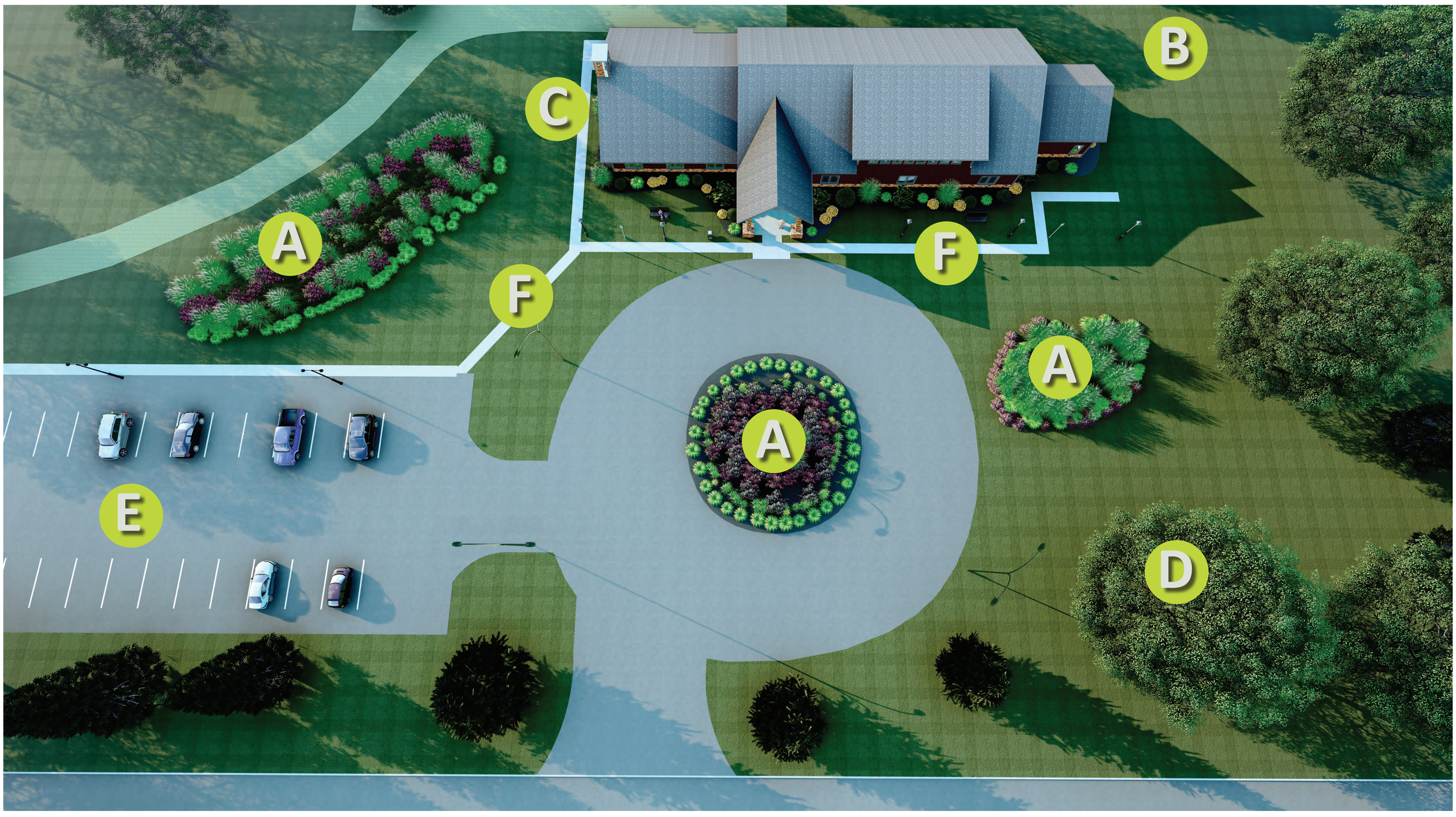
Green stormwater management at work

AT MIDDLE SMITHFIELD TOWNSHIP'S COMMUNITY & CULTURAL CENTER



Learn how green stormwater management keeps our drinking water safe and local creeks clean

- **A** NATIVE PLANT RAIN GARDEN
- **B** RESTORED MEADOWS
- **C** ROOF DOWNSPOUTS
- **D** TREE PLANTINGS
- **E** PERVIOUS ASPHALT
- **F** PERVIOUS PAVERS

SCHOONOVER MUNICIPAL CENTER
MIDDLE SMITHFIELD TOWNSHIP

Brodhead Watershed Association
BWA
www.brodheadwatershed.org

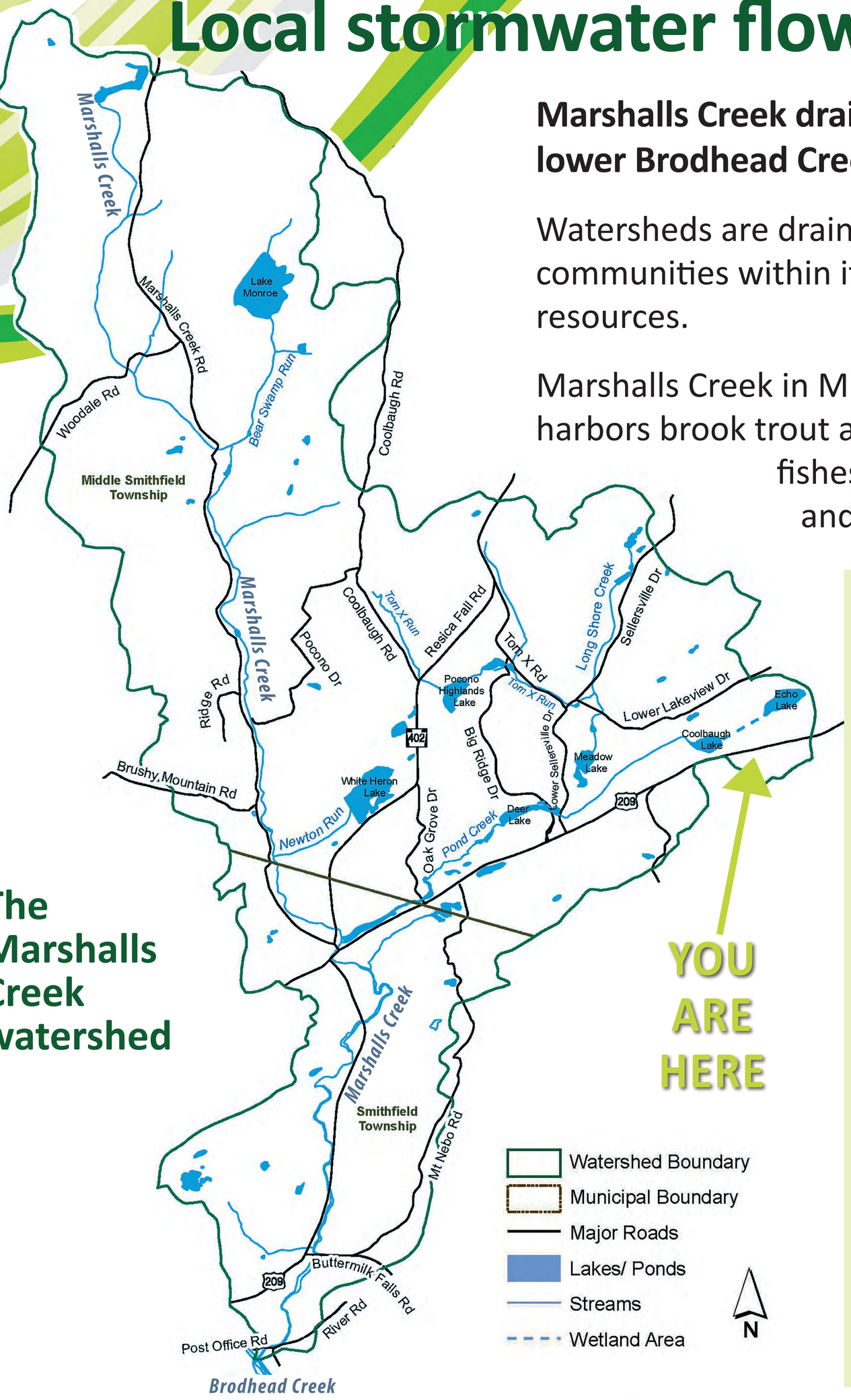
WILLIAM PENN FOUNDATION

Local stormwater flows into Marshalls Creek.

Marshalls Creek drains over 25 square miles and flows into the lower Brodhead Creek near the Delaware River.

Watersheds are drainage basins. A watershed ultimately connects the communities within it through their common dependence on water resources.

Marshalls Creek in Middle Smithfield Township harbors brook trout and brown trout, as well as rare fishes such as the bridle shiner (pictured) and ironcolor shiner.



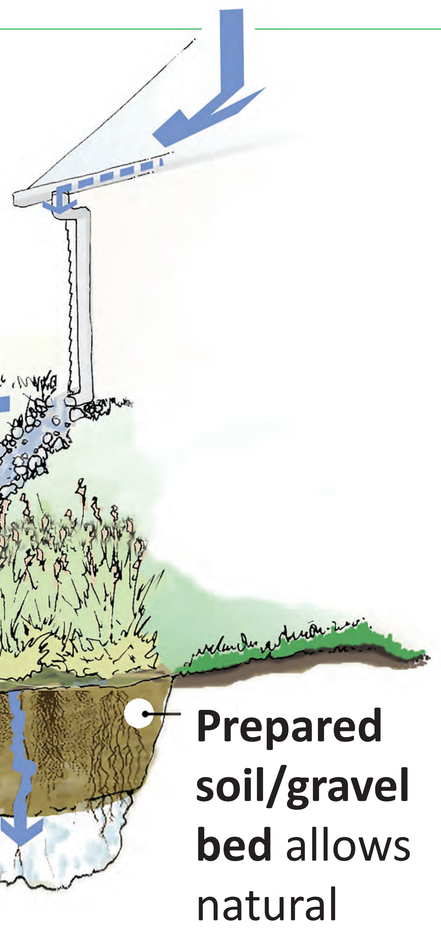
The Marshalls Creek watershed

WHY WE MUST CARE

1. More than 98% of Monroe County residents obtain drinking water from local sources.
2. Clean creeks and wetlands result in billions in cost savings and revenue.
3. Green stormwater infrastructure is more effective in the long term.
4. Pervious asphalt and paver surfaces have significant advantages to landowners.
5. The majority of Monroe County's creeks and wetlands are designated for "special protection."

Stormwater flows into rain gardens.

Native plants absorb runoff and pollutants while attracting songbirds and native pollinators.



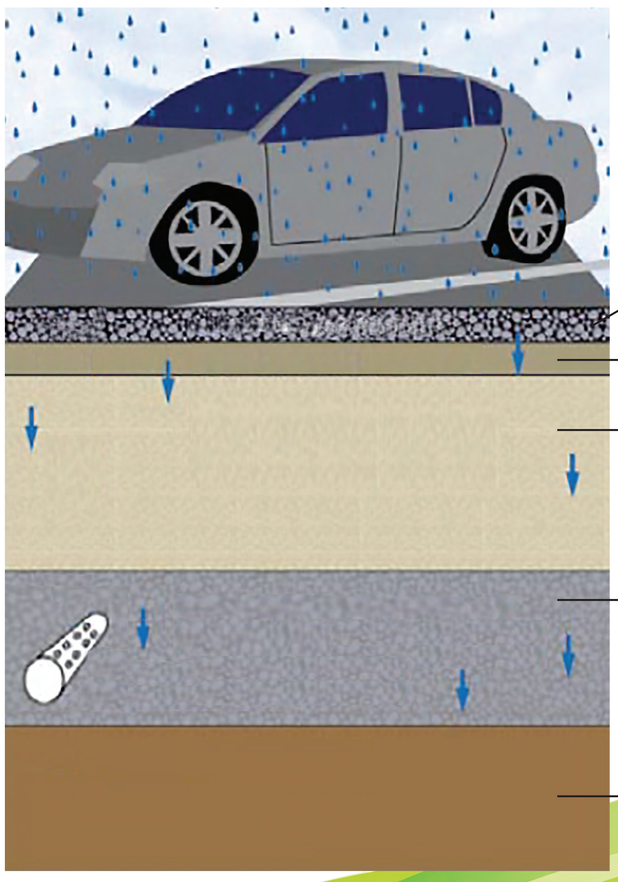
Root zone aids in nutrient uptake, microbial activity, and infiltration.

Ponding zone allows pollutants to settle and organic matter to accumulate.

Prepared soil/gravel bed allows natural infiltration into groundwater.

Courtesy University of Nebraska Extension

The pavement below our feet absorbs stormwater.



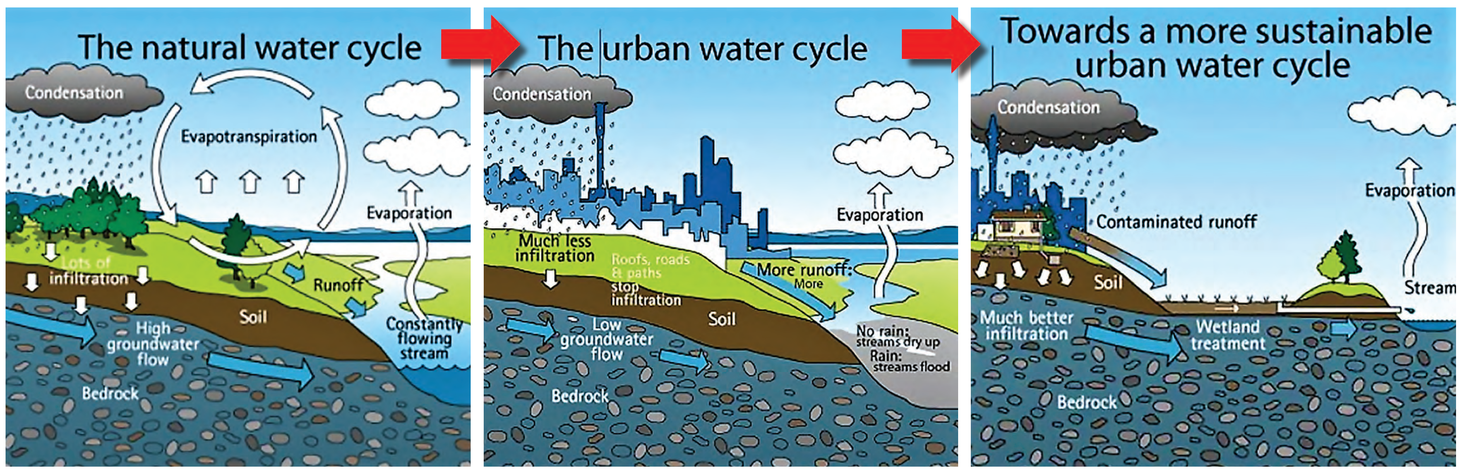
Courtesy University of New Hampshire

Green solutions
to stormwater management

Pervious asphalt and pavers

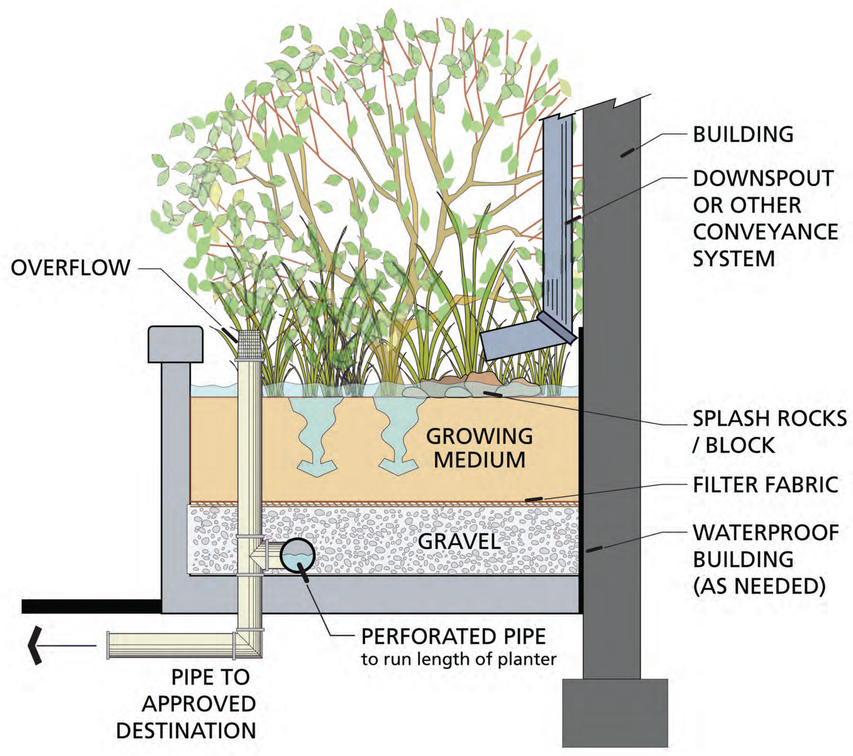
• Reduction in stormwater infrastructure (piping, catch-basins, ponds, curbing, etc.).
• Suitable for cold-climate applications, maintains recharge capacity when frozen.
• No standing water or black ice development during winter weather conditions.
• Maintains traction while wet.
• Reduced surface temperatures; minimizes the urban heat island effect.
• Extended pavement life due to well-drained base and reduced freeze-thaw.

Green infrastructure can improve stormwater effects of urbanization.



Courtesy Aukland City Council 2010

Rain gardens, trees and meadows



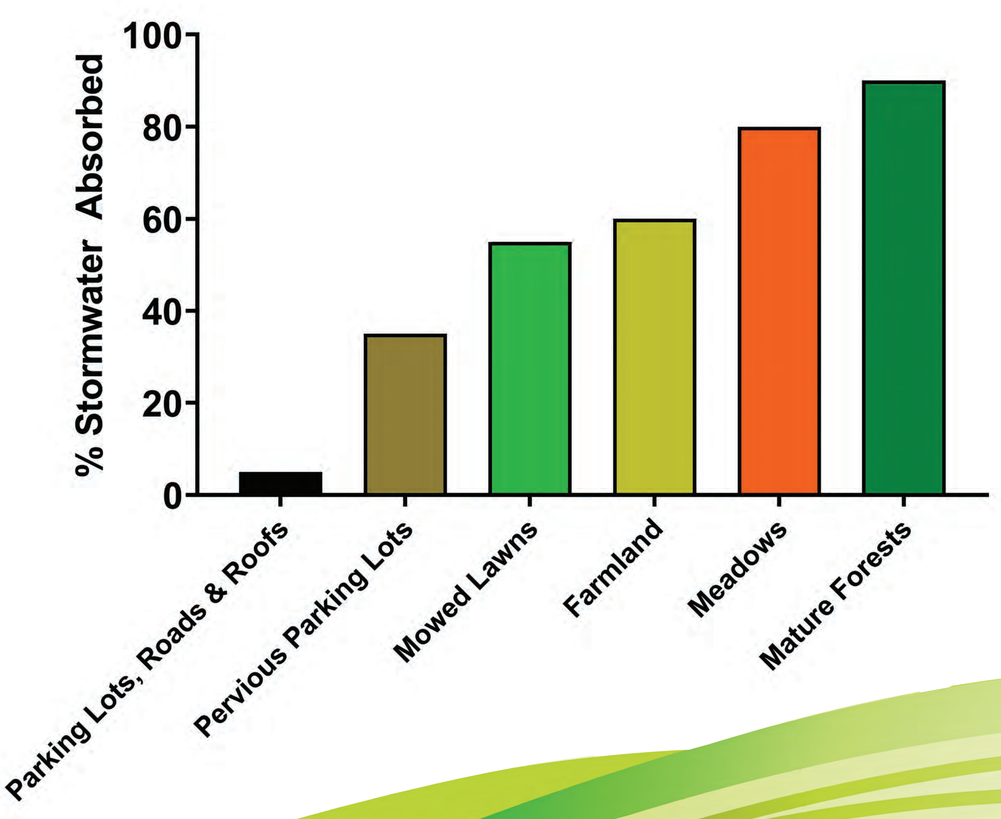
• Anti-degradation stormwater management requires a mimicking of the development site's undeveloped characteristics.

• Rain gardens and bioretention techniques improve groundwater infiltration rates with native plants and their very deep, absorptive roots.

• Rain gardens and detention basins are designed to capture the first several inches of any rainstorm. This helps prevents pollution from entering the creek.

• Rain gardens mimic natural forest ecosystems through species diversity, density and distribution of vegetation, and provide habitat for native animals like songbirds and butterflies.

The relationship between land surface and stormwater runoff



• The water in a healthy, forested creek is from 75% groundwater, 20% soil water, with just 5% coming from runoff.

• "Typical" parking lots, roads, and roofs absorb very little stormwater and create huge volumes of warm, contaminated runoff.

• Pervious asphalt, restored meadows and tree plantings significantly reduce stormwater runoff – which in turn helps to recharge groundwater in a more natural fashion.

• Forests absorb more than 90% of precipitation. If just 10% of a watershed's forests are removed, the local creeks may become impaired.