

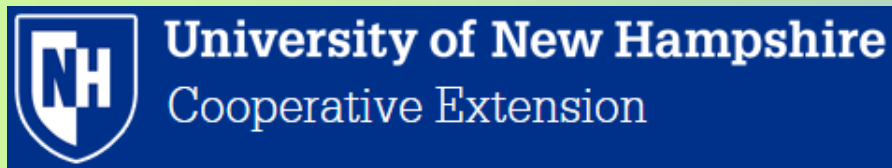
# Landscaping for Water Quality in the Lakes Region

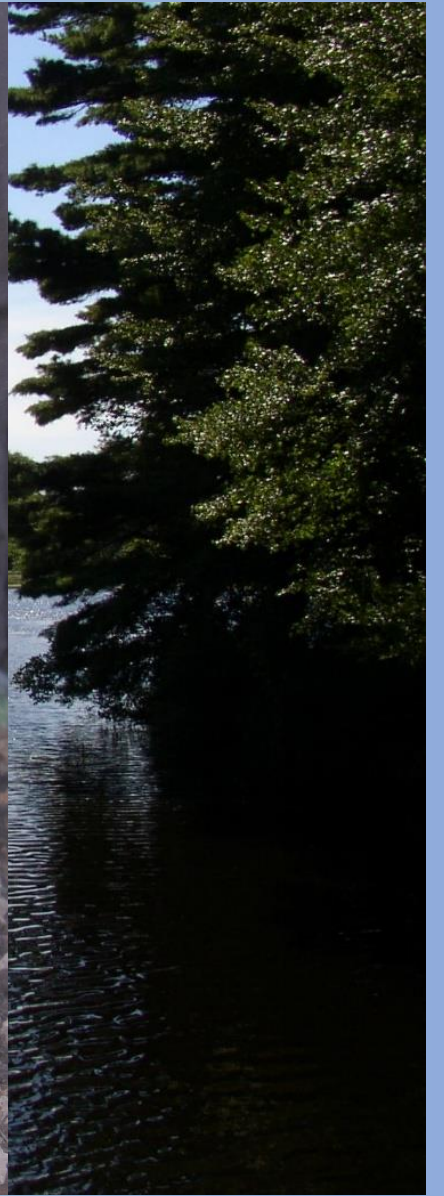
STORMWATER MANAGEMENT PRINCIPLES AND PRACTICES  
MARCH 2018

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N.H. Sea Grant and UNH Cooperative Extension

Sunapee, N.H.





# Principles for Landscaping for Water Quality Benefits

1. STOP the sources of water pollutants
2. INFILTRATE runoff into the ground
3. FILTER pollutants from runoff with plants and soil microbes



# 1. STOP the Source





For example:

Avoid  
introducing  
what's not  
needed.



**Green Grass  
Clear Water**

 **Water quality friendly lawn care and fertilizer recommendations for northern New England**

According to a recent survey, it's likely that you and your neighbors believe having a lawn that is safe for the environment is very important.\* However, some lawn care practices can create water quality problems. Excess nutrients (including nitrogen and phosphorus found in fertilizers) that run off our properties into local waterbodies can trigger algal blooms that cloud water and rob it of oxygen.

Many of us enjoy the time we spend working on our lawns and are willing to try new practices as long as our lawns continue to look good.\* Here are some easy practices for creating and maintaining a truly healthy lawn – attractive and safer for the environment.

For additional resources, please visit:  
[www.extension.unh.edu/Sustainable-Landscapes-and-Turf](http://www.extension.unh.edu/Sustainable-Landscapes-and-Turf)

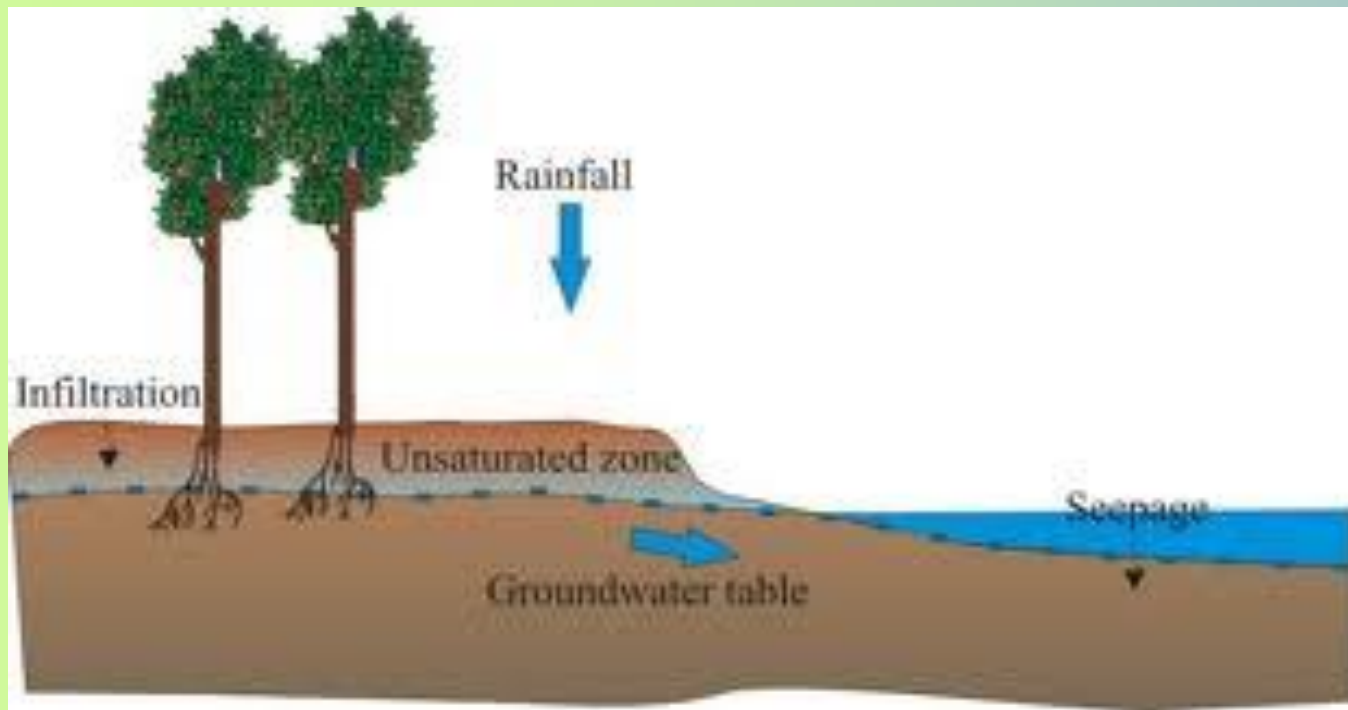


**Simple Recommendations for Every Lawn**

- 1. Choose the Right Grass Seed**
  - Consider limiting lawn area to locations where grass will grow easily and will actually be used for outdoor activities.
  - Choose grass varieties that require less maintenance. For northern New England, choose seed mixes with higher percentages of turf-type tall fescues, compact-type fall fescues and/or fine fescues. Choose mixes with smaller percentages of Kentucky bluegrass and/or perennial ryegrass.
  - In shaded areas, select shade-tolerant turf grasses like fine-leaf and tall fescues.
  - Up to 10% of total seed mix can be white clover to help fix nitrogen in soil naturally. Avoid clover if anyone in the household is allergic to bee stings.
- 2. Don't Overwater**
  - If irrigating, one inch of water per week is typically enough. Overwatering can lead to runoff and leaching of contaminants into groundwater.
- 3. Test Your Soil**
  - Sometimes adjusting the soil pH or organic matter are the only treatments needed to improve a lawn. If the soil test results come back as acceptable but your lawn is not, then check for other problems like pest infestations. Learn more at: [bit.ly/Test-Your-Soil](http://bit.ly/Test-Your-Soil)
- 4. Mow Smart**
  - Mow grass 3" or higher. Cut no more than 1/3 of the blade to encourage longer, stronger turf grass roots. Leave the clippings after mowing to provide a source of low release nutrients.

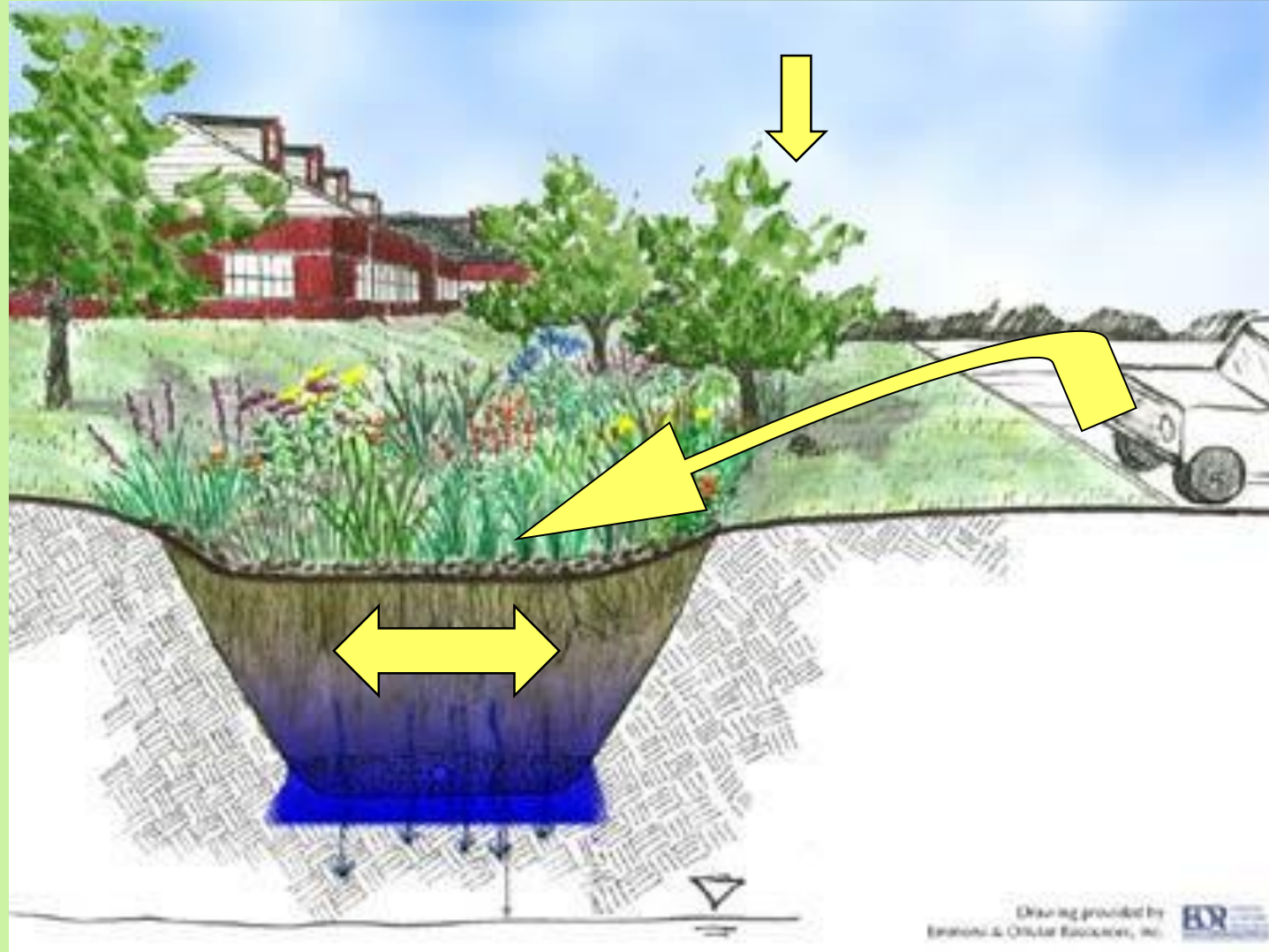


## 2. Promote INfiltration



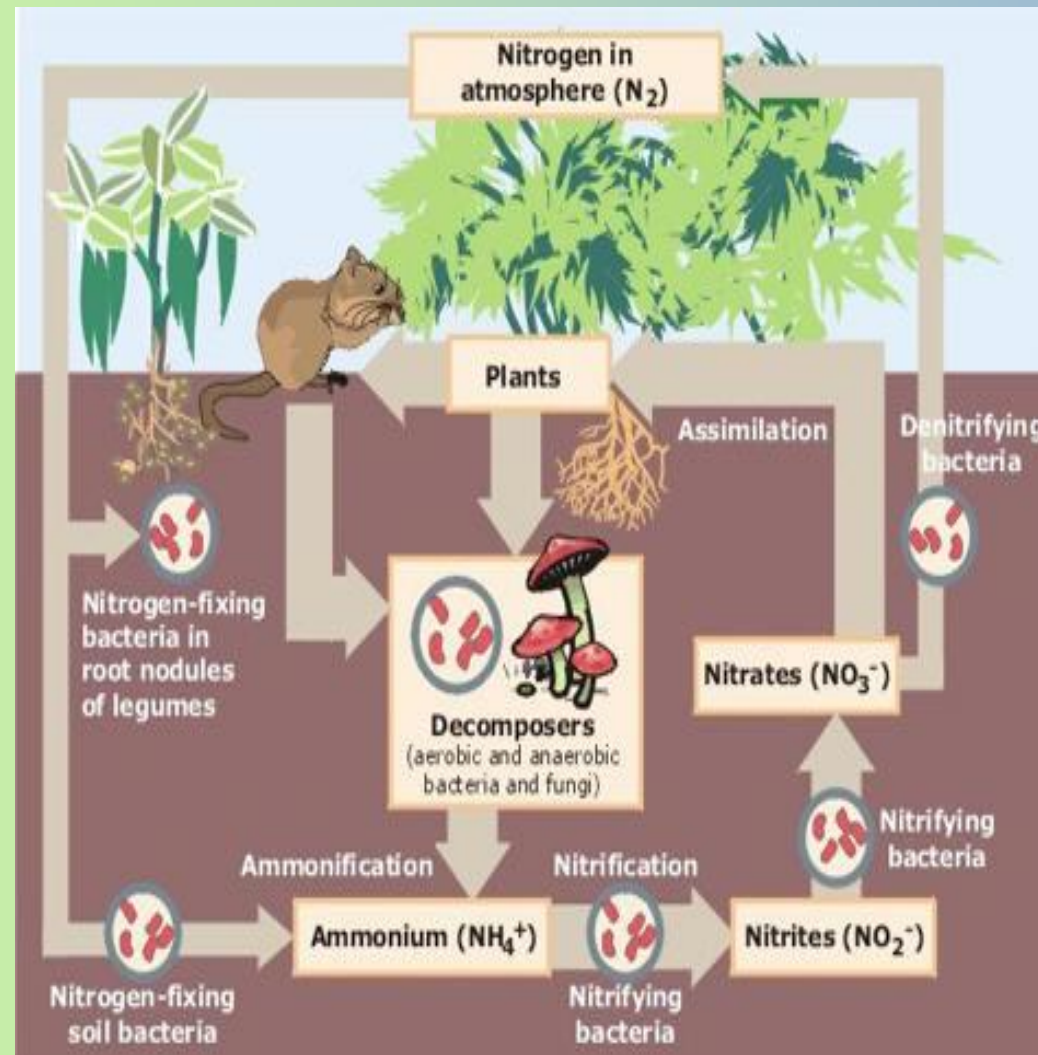


### 3. Promote FILTRATION





# Nitrogen Cycle



# Review

1. STOP the sources of water pollutants
2. INFILTRATE runoff into the ground
3. FILTER pollutants from runoff with plants and soil microbes

# Pop Quiz!









# DOGGIE-BAGS®

DOG OWNERS  
**BE CONSIDERATE**



**CLEAN UP BEHIND YOUR DOG !**



**PLEASE TAKE A BAG**



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at [WWW.doggie-bags.com](http://WWW.doggie-bags.com)

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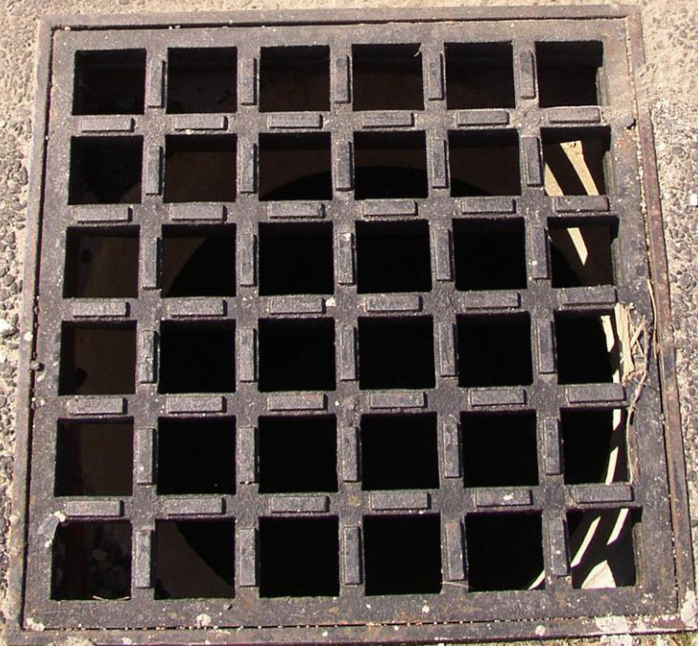




DUMP NO WASTE



DRAINS TO HARBOR













# What's a Landscaper to Do?



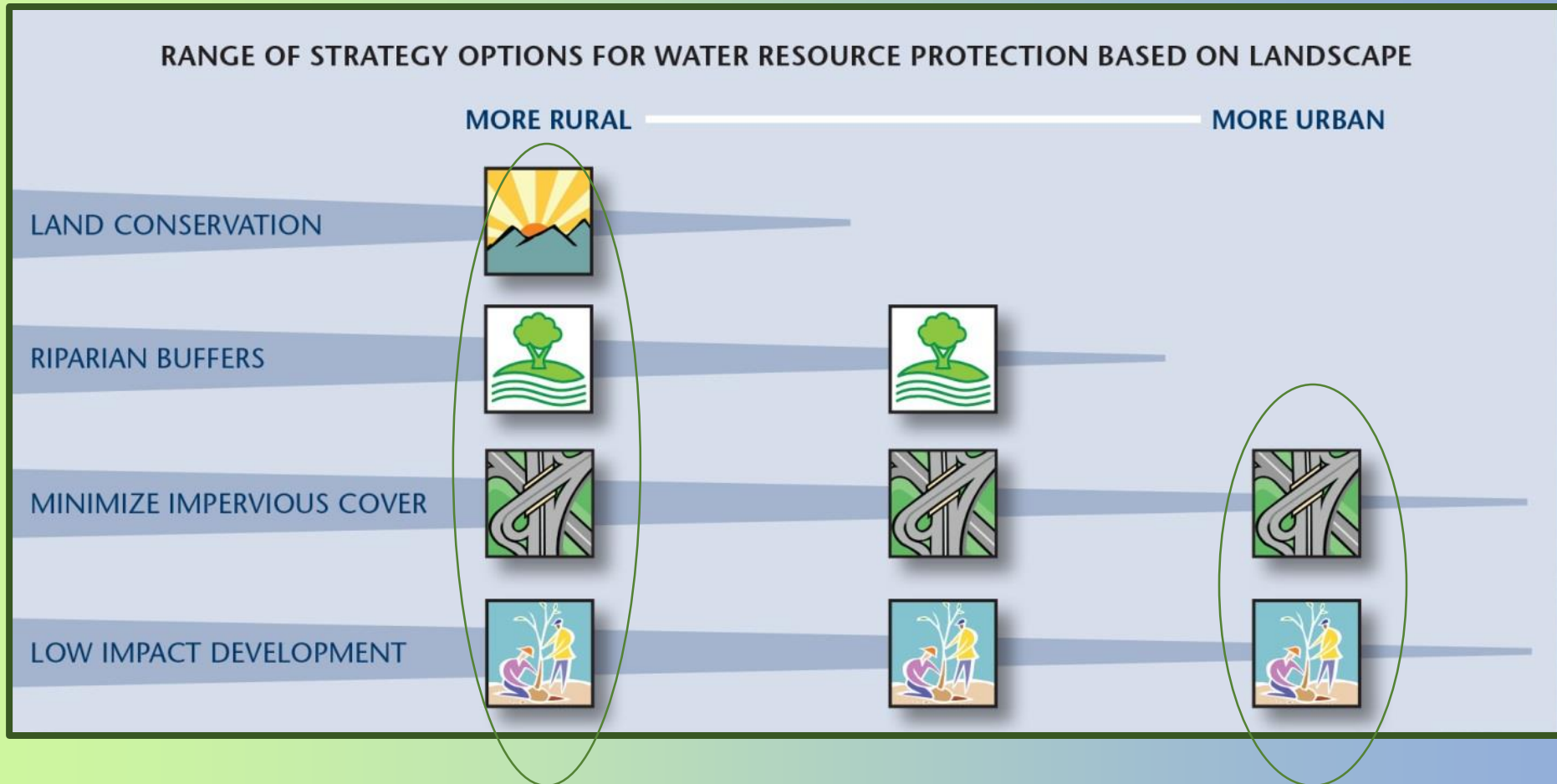




# Can Working at the Property Scale Make a Difference?

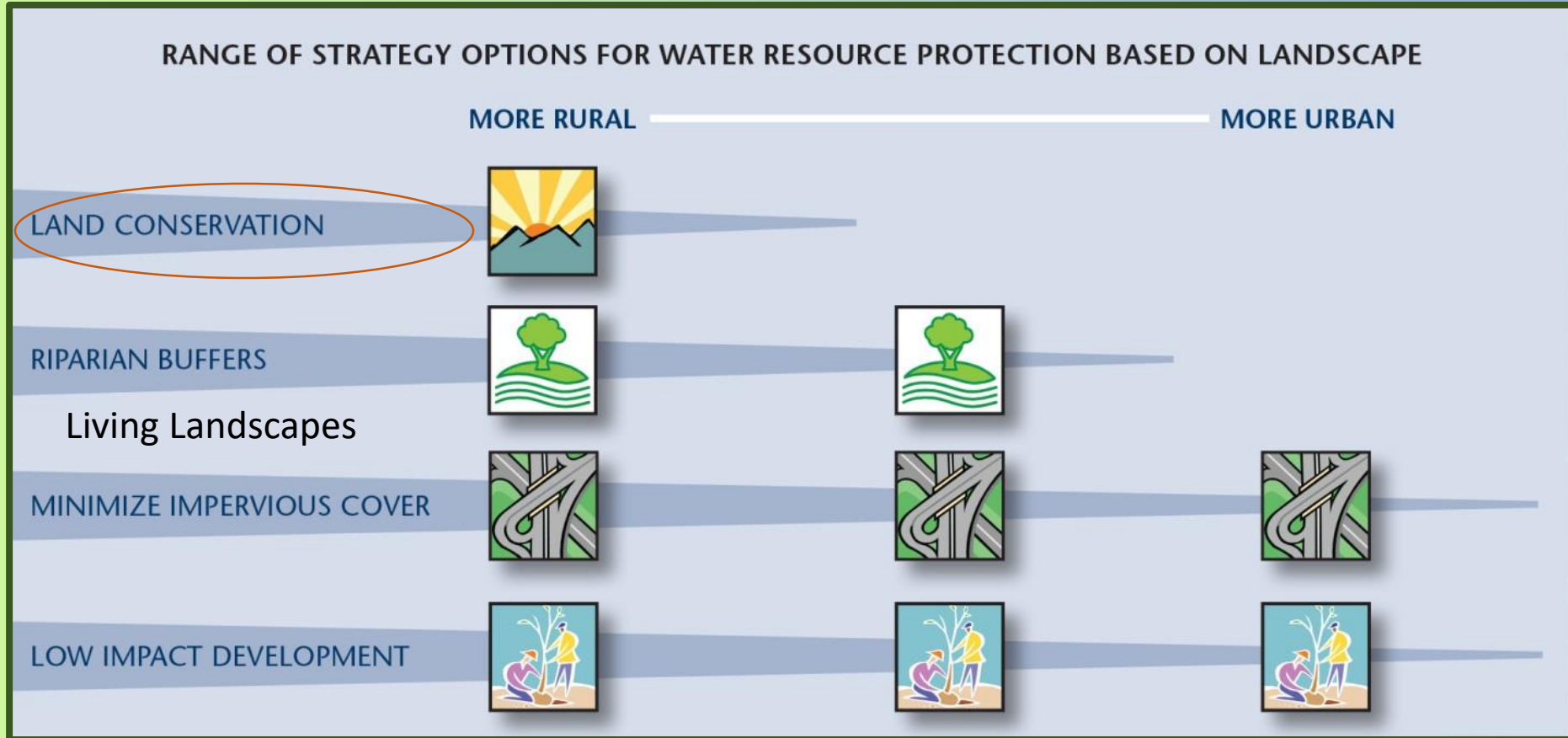


# Opportunities for Communities





# Opportunities for Communities and Individuals



Graphic by Tricia Miller, MillerWorks Graphic Design



# Land Conservation and Stormwater



Slide series from Amanda Stone, UNH Cooperative Extension



# Land Conservation = Permanent Land Protection





# Primary Benefits of Land Protection

- Keeps natural systems intact
- Reduces flooding – provides infiltration
- Protects water quality - provides filtration

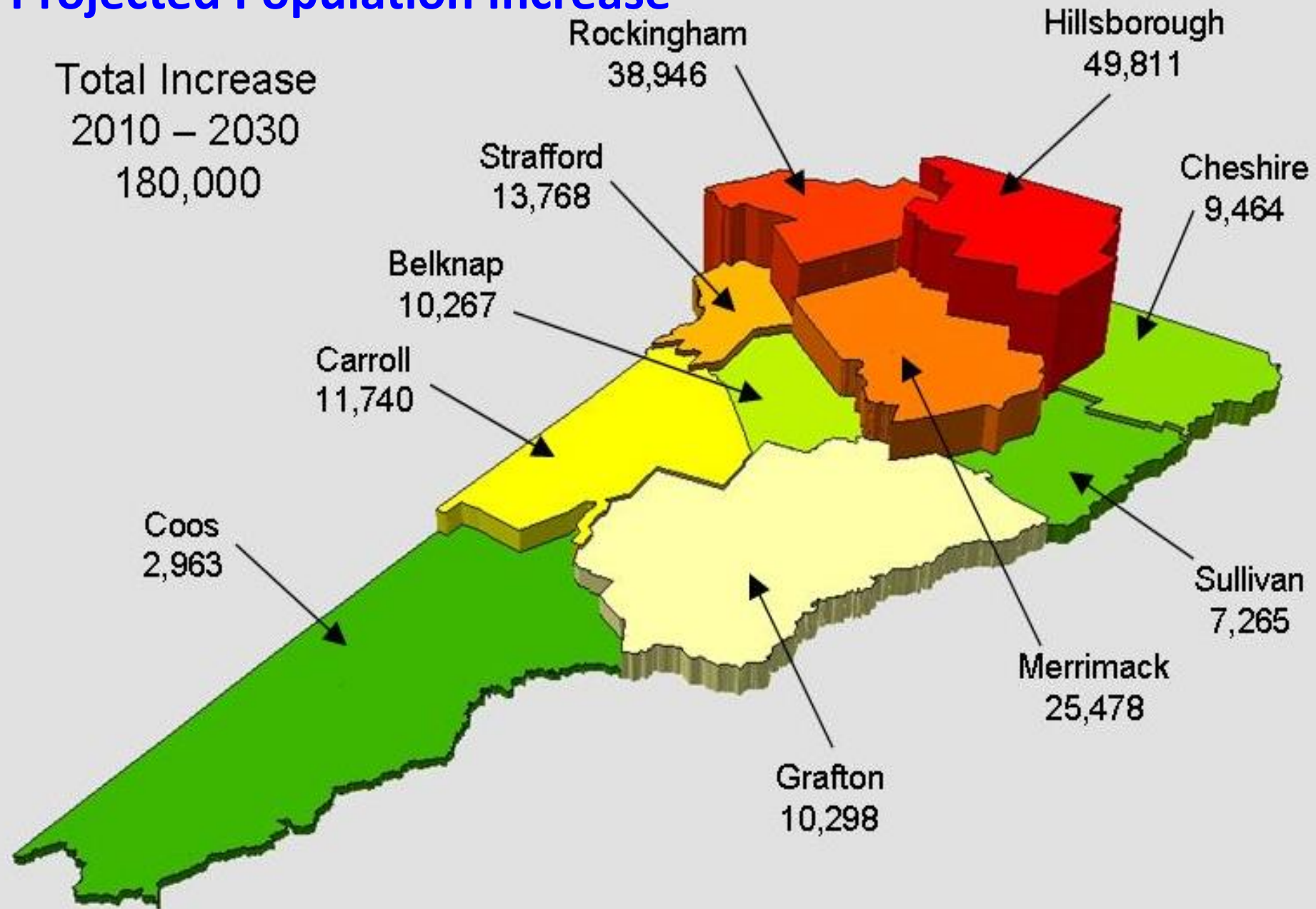
*As well as other social and economic benefits*





# Projected Population Increase

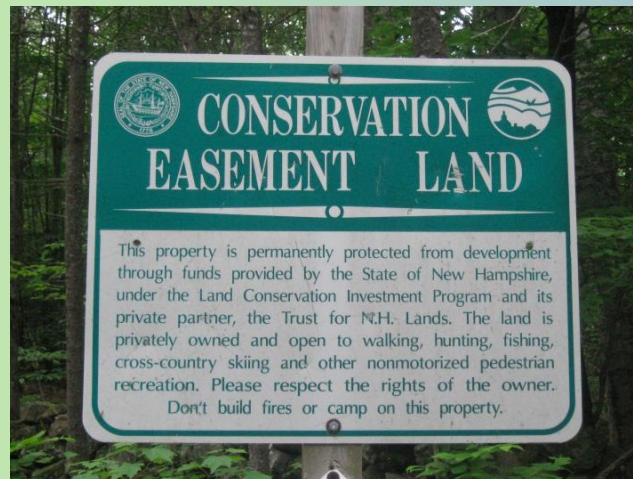
Total Increase  
2010 – 2030  
180,000



# How is Land Conservation Carried Out?

## Conservation Easement Definition

**Voluntary** legal agreement between a landowner and conservation organization (easement holder) that **permanently** limits certain uses of the land in order to protect conservation values





## Usually Involves a Land Trust

## List of NH Land Trusts and Conservation Groups:

[nhltc.org](http://nhltc.org)

## NH LAND TRUSTS GEOGRAPHIC COVERAGE

### Statewide Coverage Land Trusts

Archaeological Conservancy  
Audubon Society of NH  
The Nature Conservancy  
New England Forestry Foundation  
New England Wildflower Society  
NH Preservation Alliance  
Society for the Protection of NH Forests  
The Trust for Public Land  
Wildlife Land Trust

## Local Land Trusts

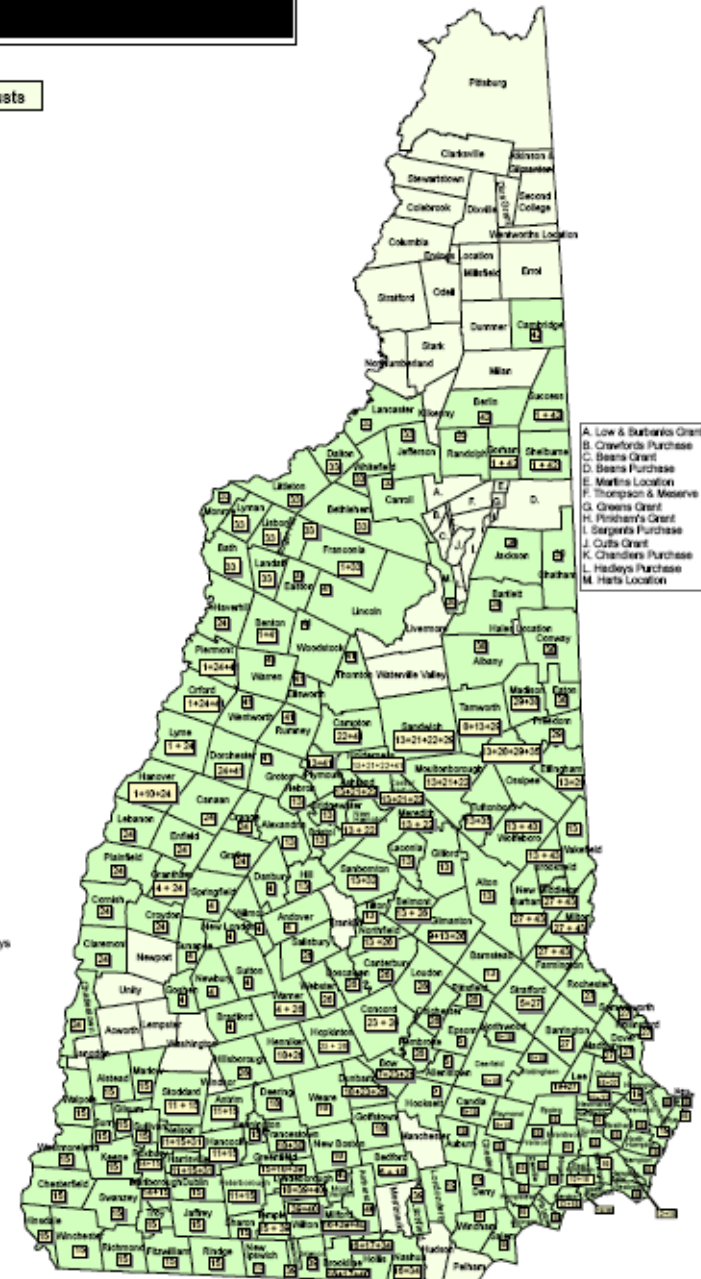
- 1 The Appalachian Trail Conf. Land Trust
- 2 Auburn Sargent Land Preservation Trust
- 3 Bear-Paw Regional Greenways
- 4 Bedford Land Trust
- 5 Bow Open Spaces
- 6 Chocoma Lake Conservation Foundation
- 7 Glendon Land Trust
- 8 Haverover Conservancy
- 9 Hattie Center for Conservation Education
- 10 Howlands Trust
- 11 Lakes Region Conservation Trust
- 12 MacBorough-Roxbury Land Association
- 13 Monadnock Conservancy
- 14 Nichols-Smith Conservation Land Trust
- 15 Nisakalil River Land Trust
- 16 Piscataqua Land Conservancy
- 17 Southeast Land Trust of NH
- 18 Squam Lakes Association
- 19 Squam Lakes Conservation Society
- 20 Turkey River Basin Trust
- 21 Upper Valley Land Trust
- 22 Five Rivers Conservation Trust
- 23 Stratford Rivers Conservancy
- 24 Roland Park Land Trust
- 25 Green Mountain Conservation Group
- 26 Newfoundlow Land Conservation Inc.
- 27 River Lake Land Trust
- 28 Sanborn Agriculture and Land Trust
- 29 Vermonts Conservation Trust
- 30 Nashua River Watershed Association
- 31 Den Hole Pond Watershed Trust
- 32 Upper Sco Valley Land Trust
- 33 Monadnock Community Land Trust
- 34 Southern Valley Land Trust
- 35 Penn-Baker Land Trust
- 36 Mahoeaux Land Trust
- 37 Moose Mountains Regional Greenways

## Information not available

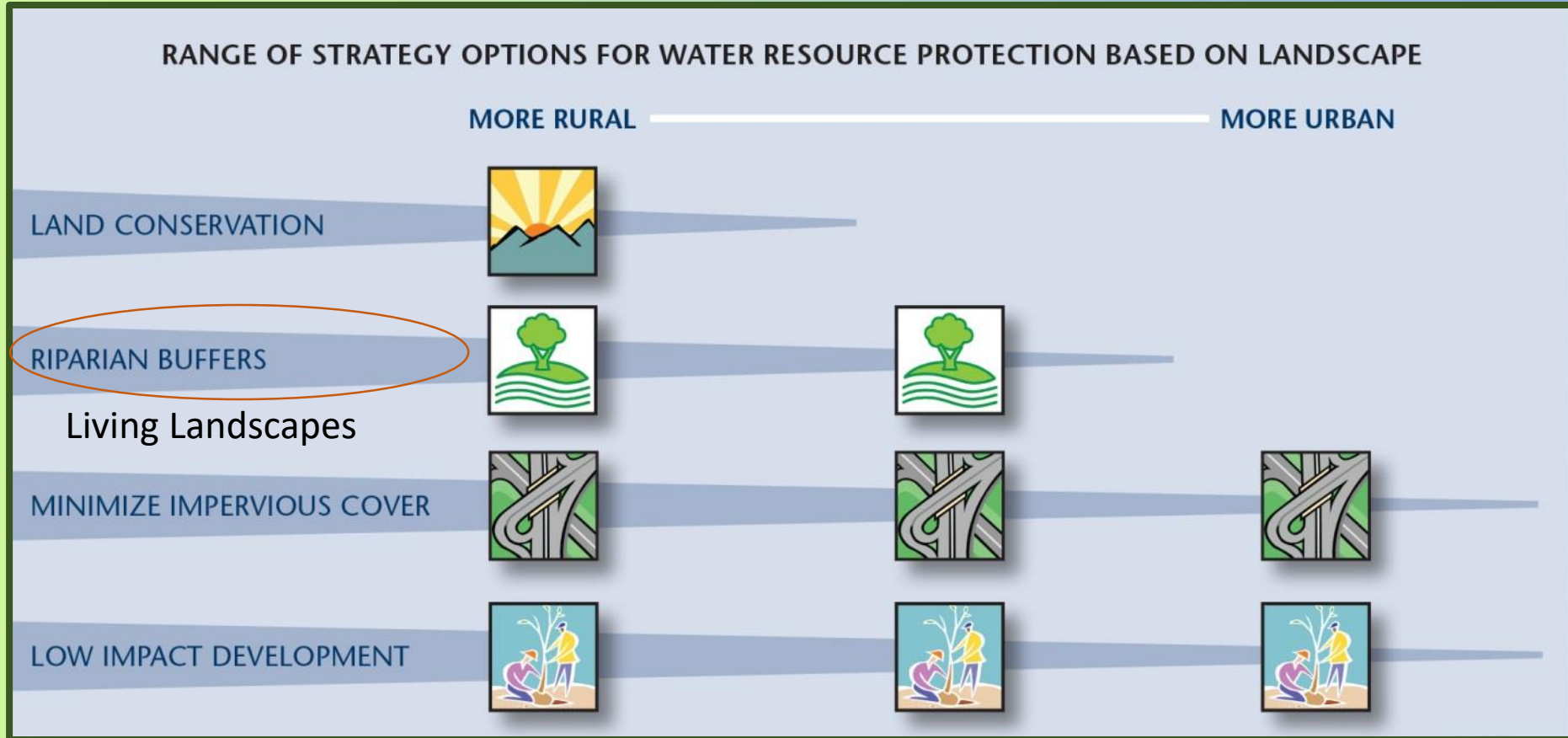
Amherst Land Trust  
Great Bay Resource Protection Partnership  
Highland Lake Association

Map produced by USH Cooperative Extension  
Community Conservation Assistance Program  
Contact Sharon Hughes for information (360) 300-  
XXXX

May 2012



# Clean Water Strategies



Graphic by Tricia Miller, MillerWorks Graphic Design

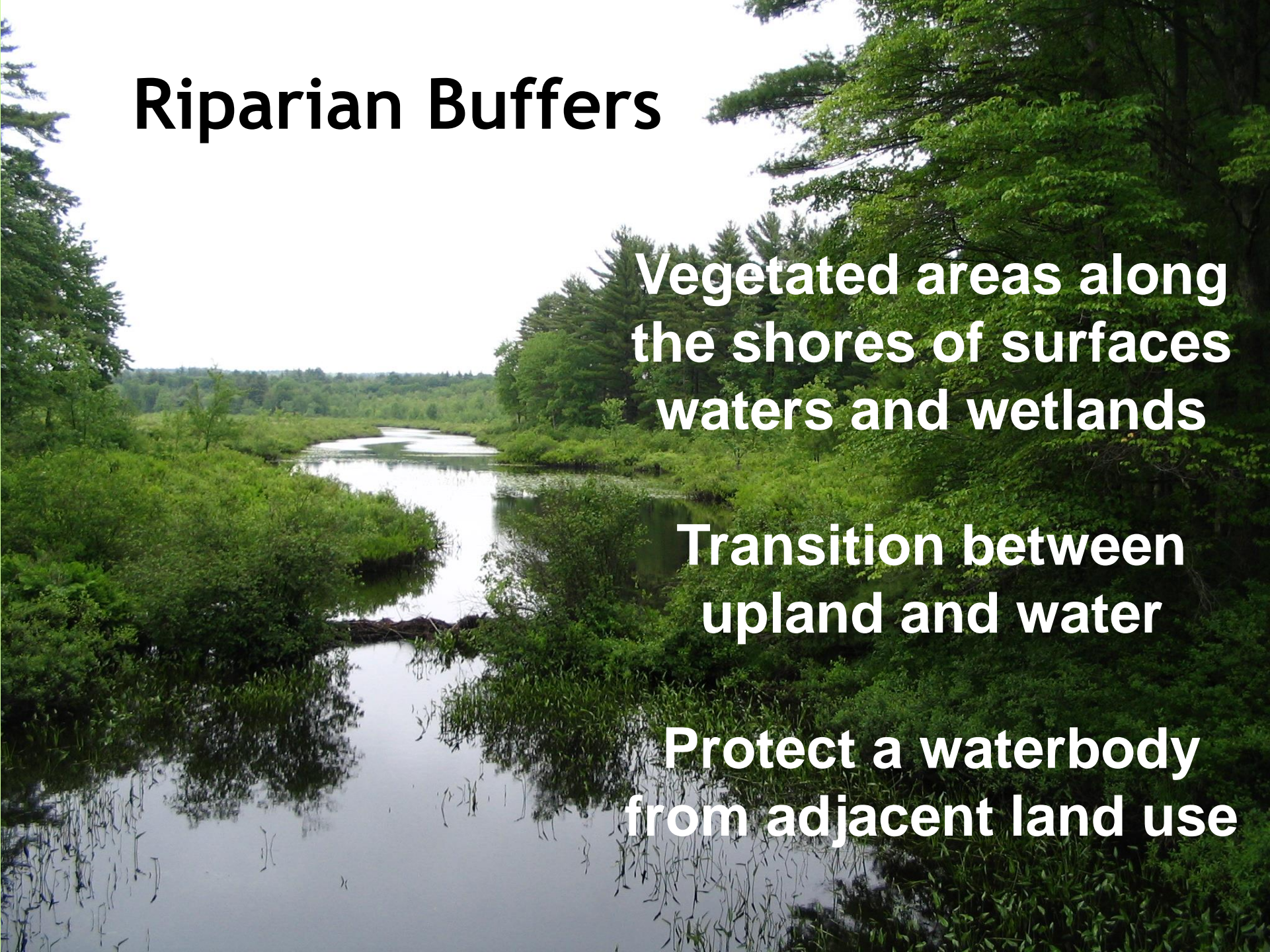


# Riparian Buffers

**Vegetated areas along  
the shores of surface  
waters and wetlands**

**Transition between  
upland and water**

**Protect a waterbody  
from adjacent land use**





A photograph of a forest stream with large rocks and moss. The stream flows through a dense forest with many trees and green foliage. Large, moss-covered rocks are scattered throughout the stream, creating small rapids and pools of water. The water is clear and reflects the surrounding greenery. The overall scene is peaceful and natural.

# Primary Benefits of Riparian Buffers

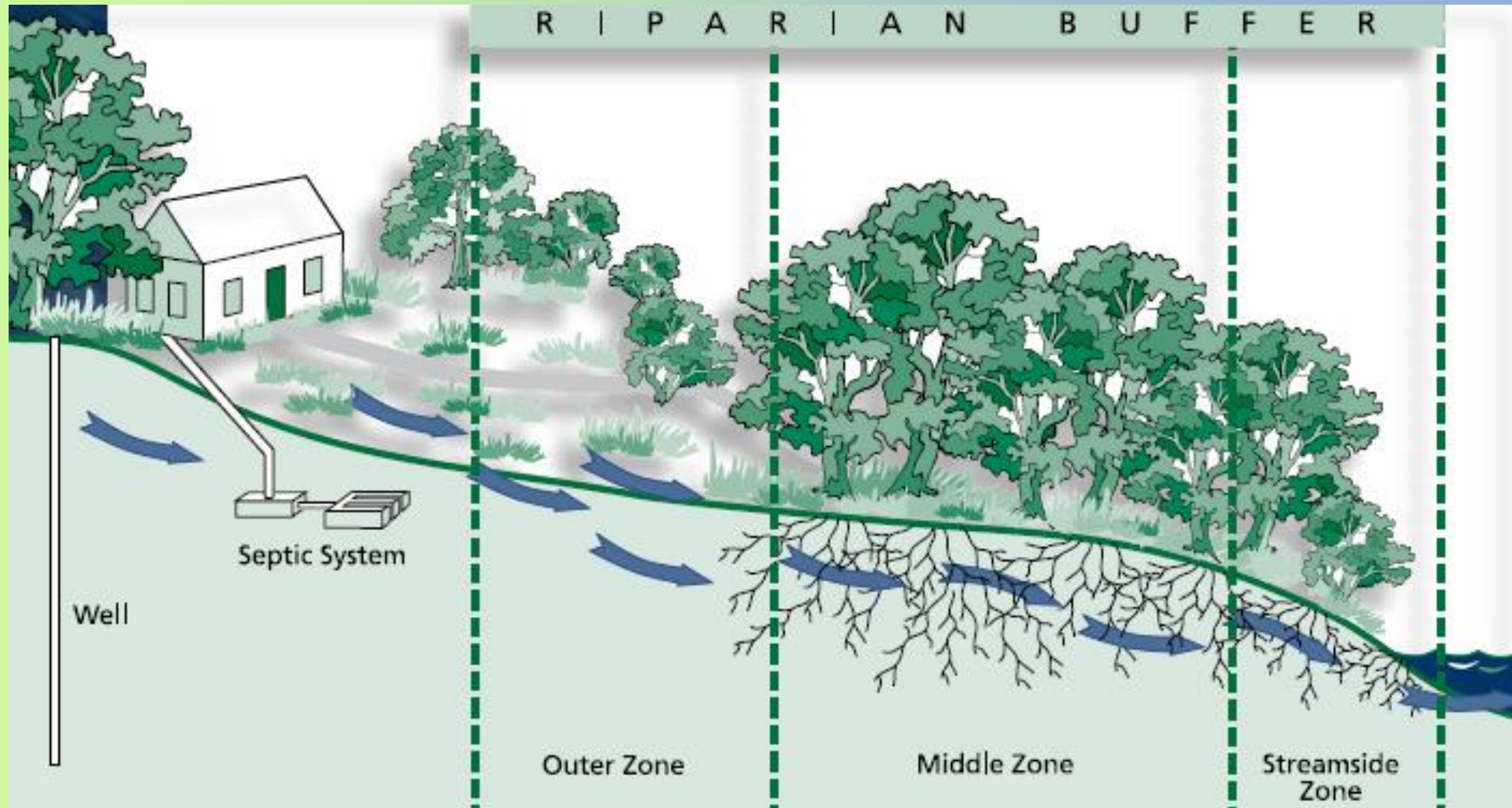
Reduce flooding

Protect water quality

Stabilize banks



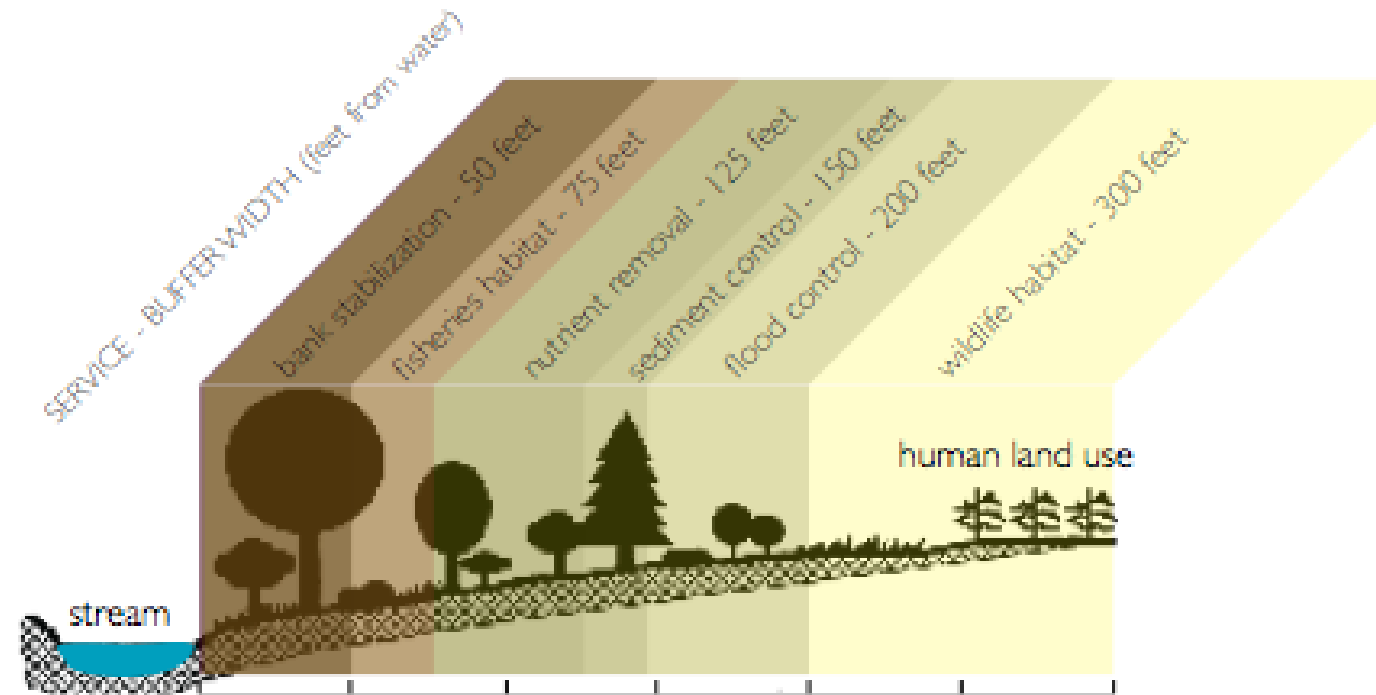
# Buffers can be naturally present OR planted and maintained





# Buffer Widths Affect Benefits

*Figure 5. Environmental Services Provided by Various Shoreland Buffer Widths*

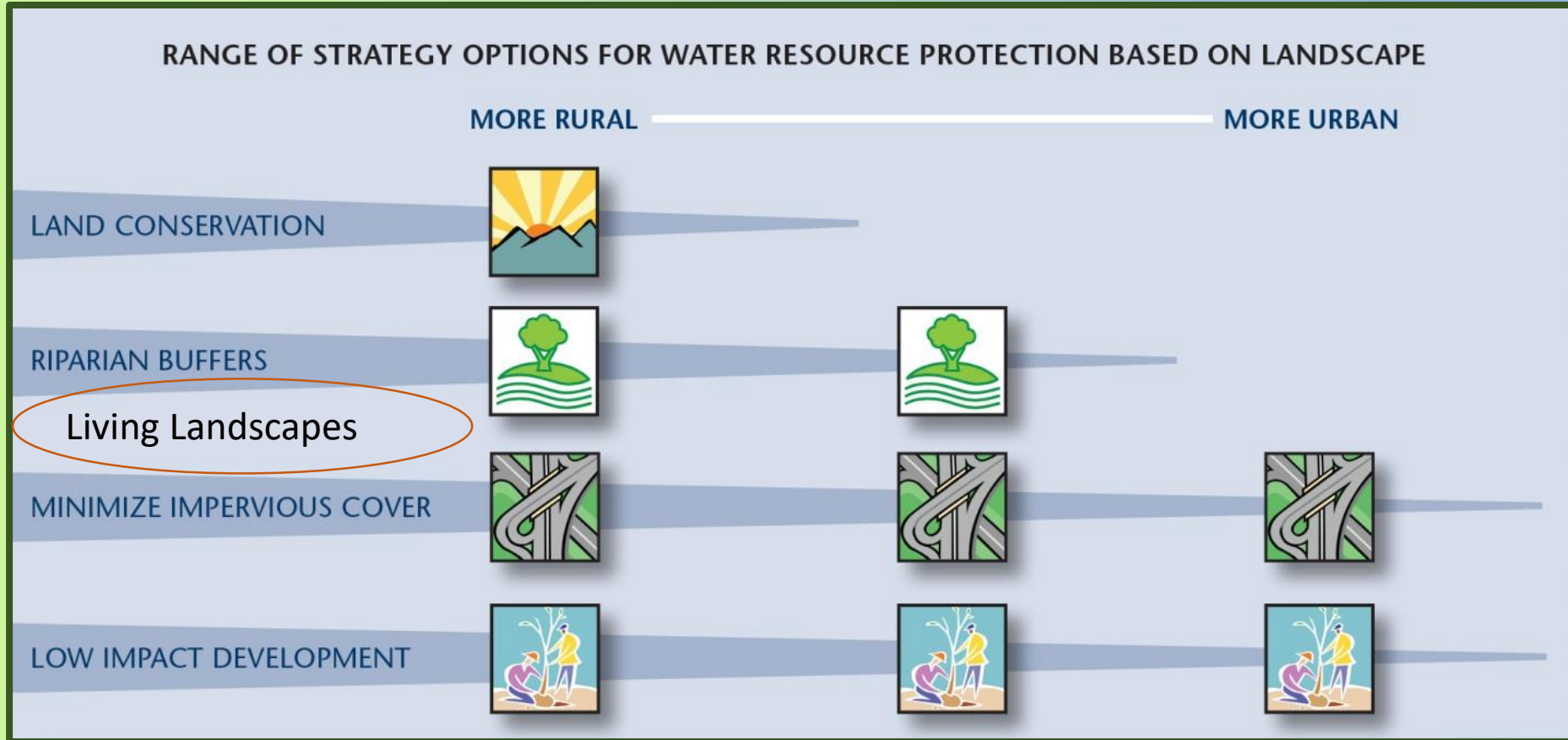


*Source: adapted from Connecticut River Joint Commission, 2000.*

As displayed in  
*Piscataqua Region  
Estuaries Partnership  
Assessment Report*



# Clean Water Strategies – Living Landscapes



Graphic by Tricia Miller, MillerWorks Graphic Design

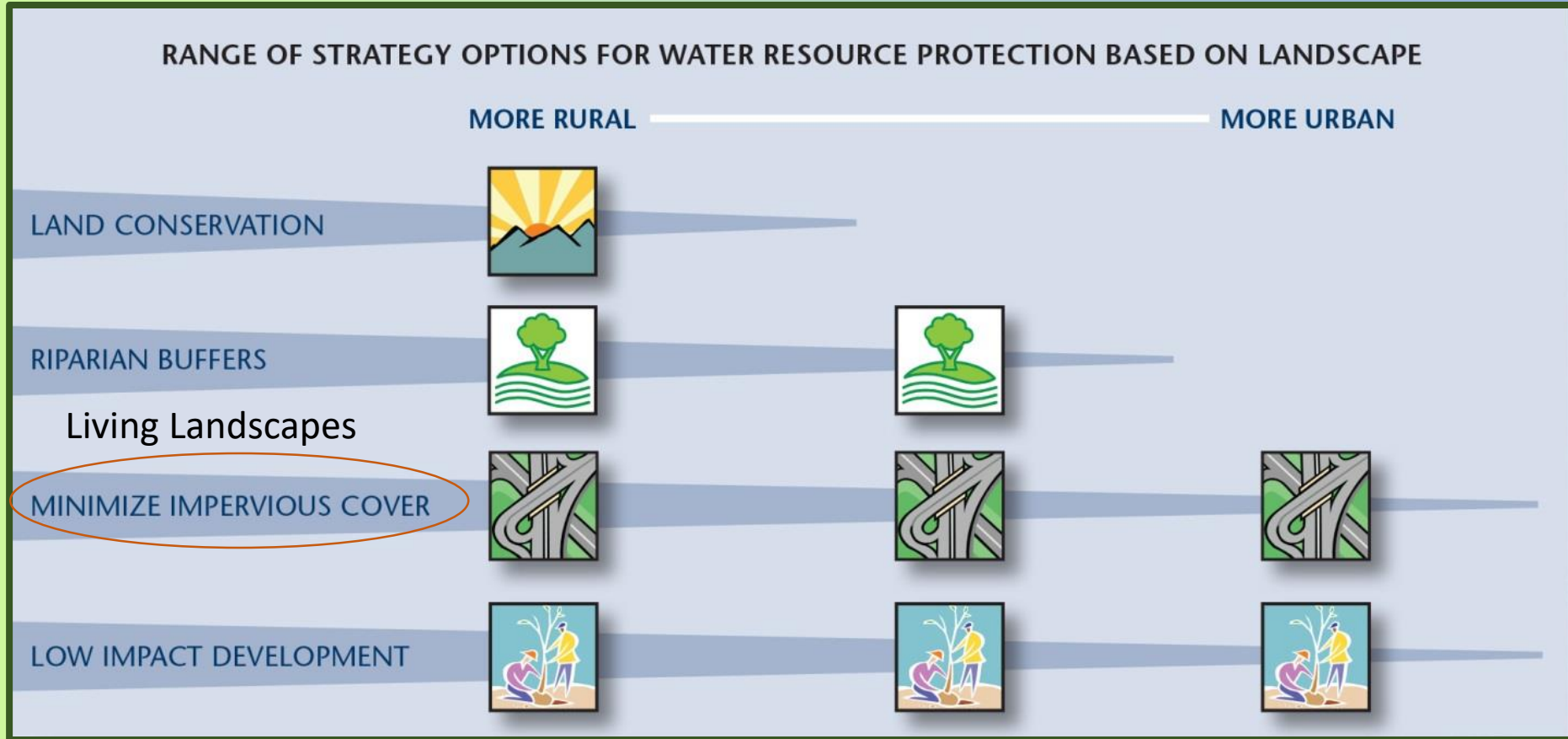


# Living Landscapes



Image source - <http://lindenlandgroup.com/blog>

# Clean Water Strategies



Graphic by Tricia Miller, MillerWorks Graphic Design



# What's Entering the Stormdrain?



# Not All Impervious Cover is Created Equal

*View from Above*



**Total IC=**

- ALL impervious cover within a catchment area

**Effective IC =**

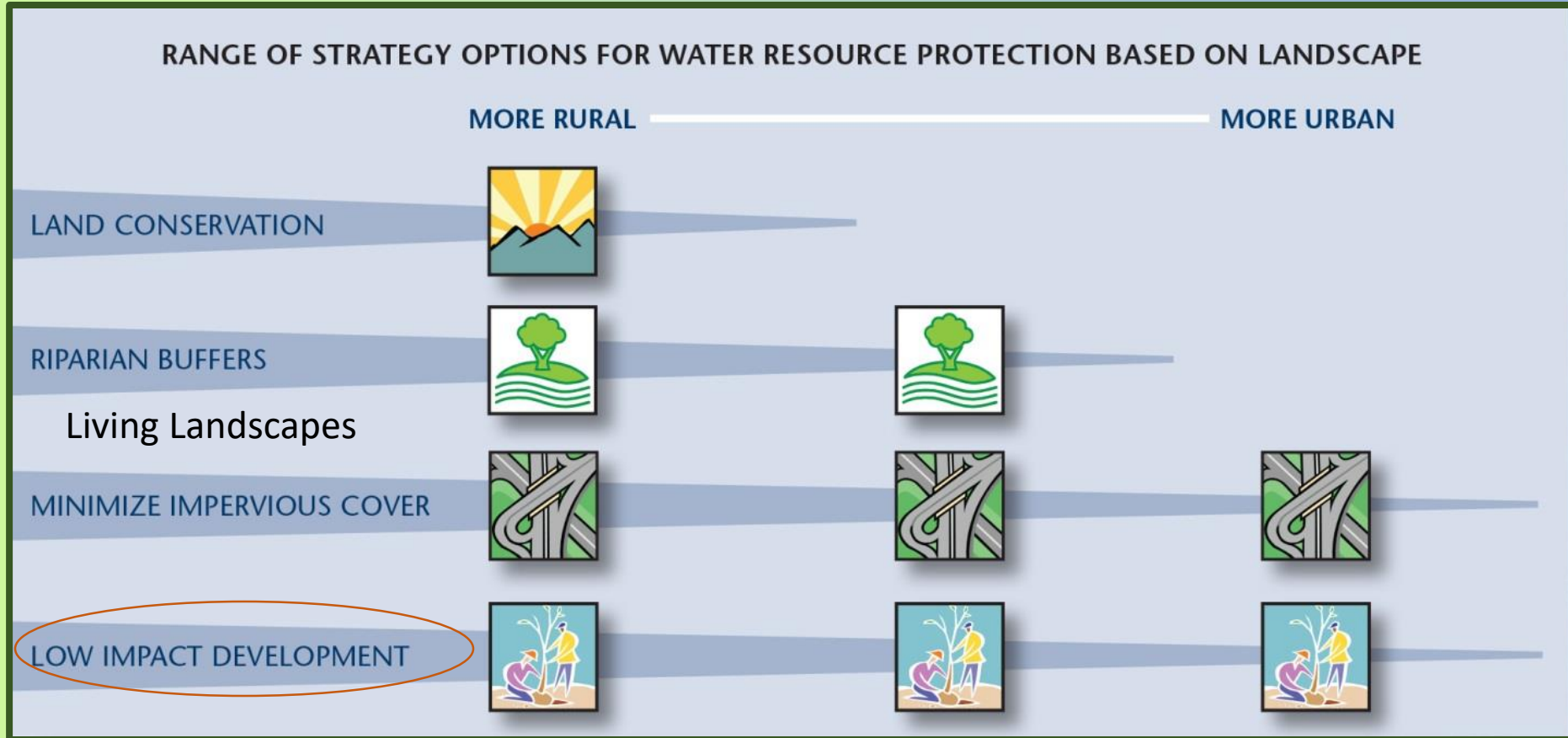
- Portion of area where stormwater is “effectively” transported directly to a stream channel or stormwater pipe



# Strategy: Limit or Disconnect Impervious Cover



# Clean Water Strategies



Graphic by Tricia Miller, MillerWorks Graphic Design



# What's a Landscaper to Do?



Courtesy of UCONN Cooperative Extension

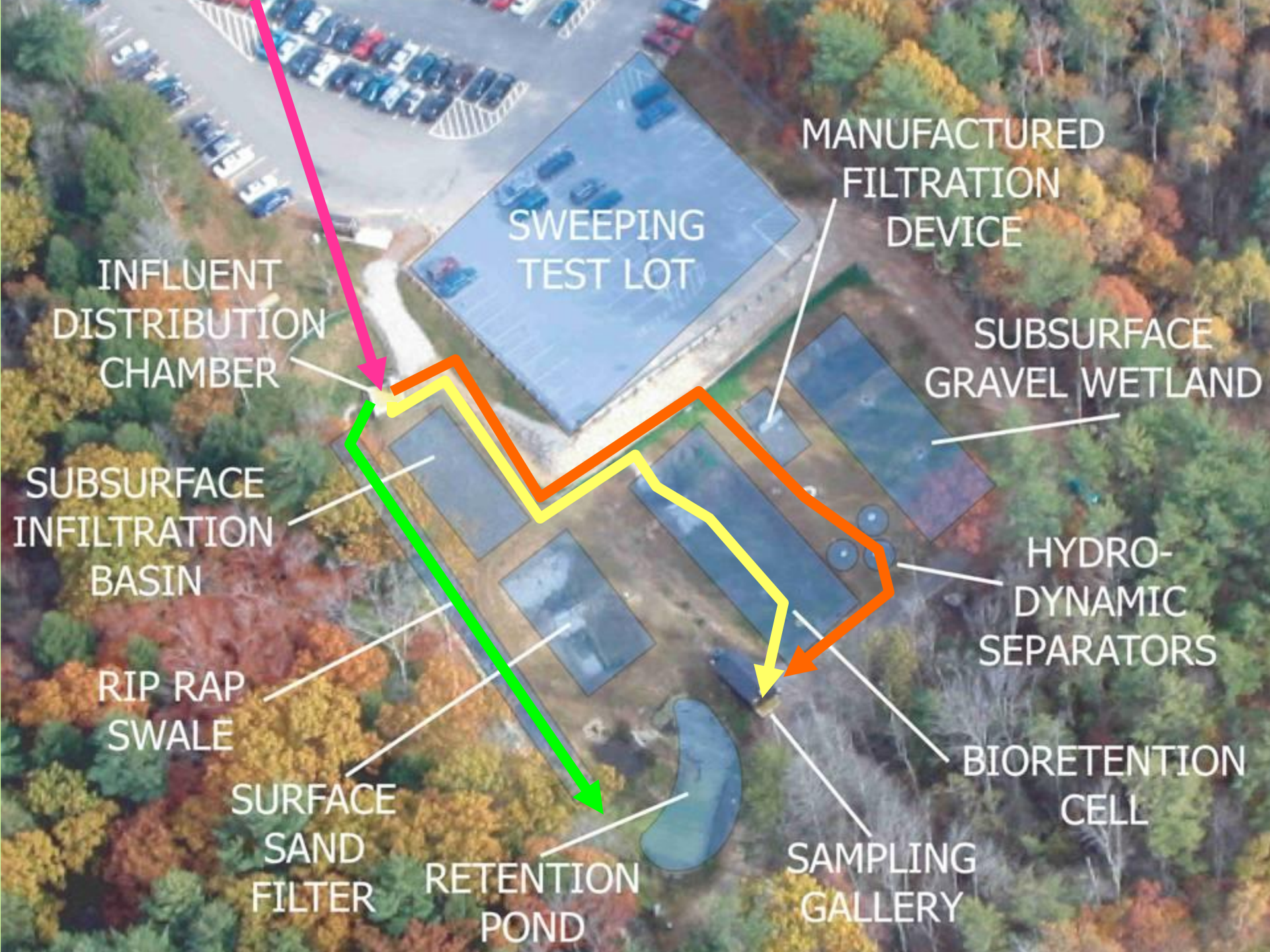
# Does Low Impact Development Work?

## Research Field Facility at UNH

T<sub>c</sub> ~ 19 minutes











Hydrodynamic Separator



Isolator Row



Subsurface Infiltration



Filter Unit



Porous Asphalt



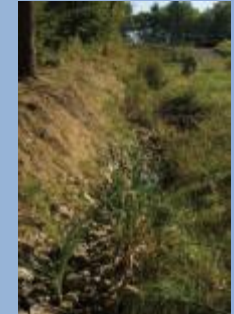
Pervious Concrete



Retention Pond



Stone Swale



Veg Swale



Gravel Wetland



Sand Filter



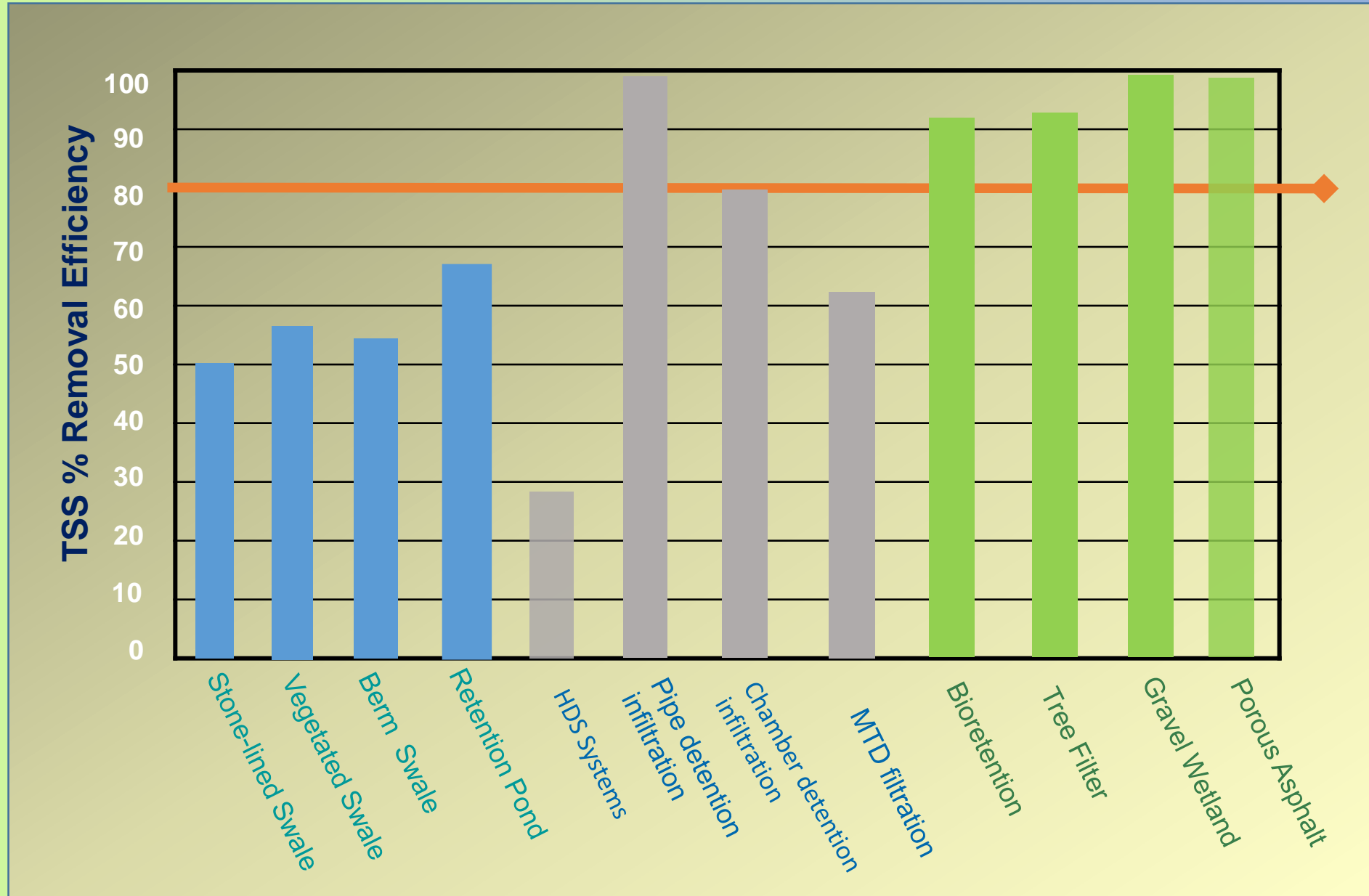
Bioretention Unit



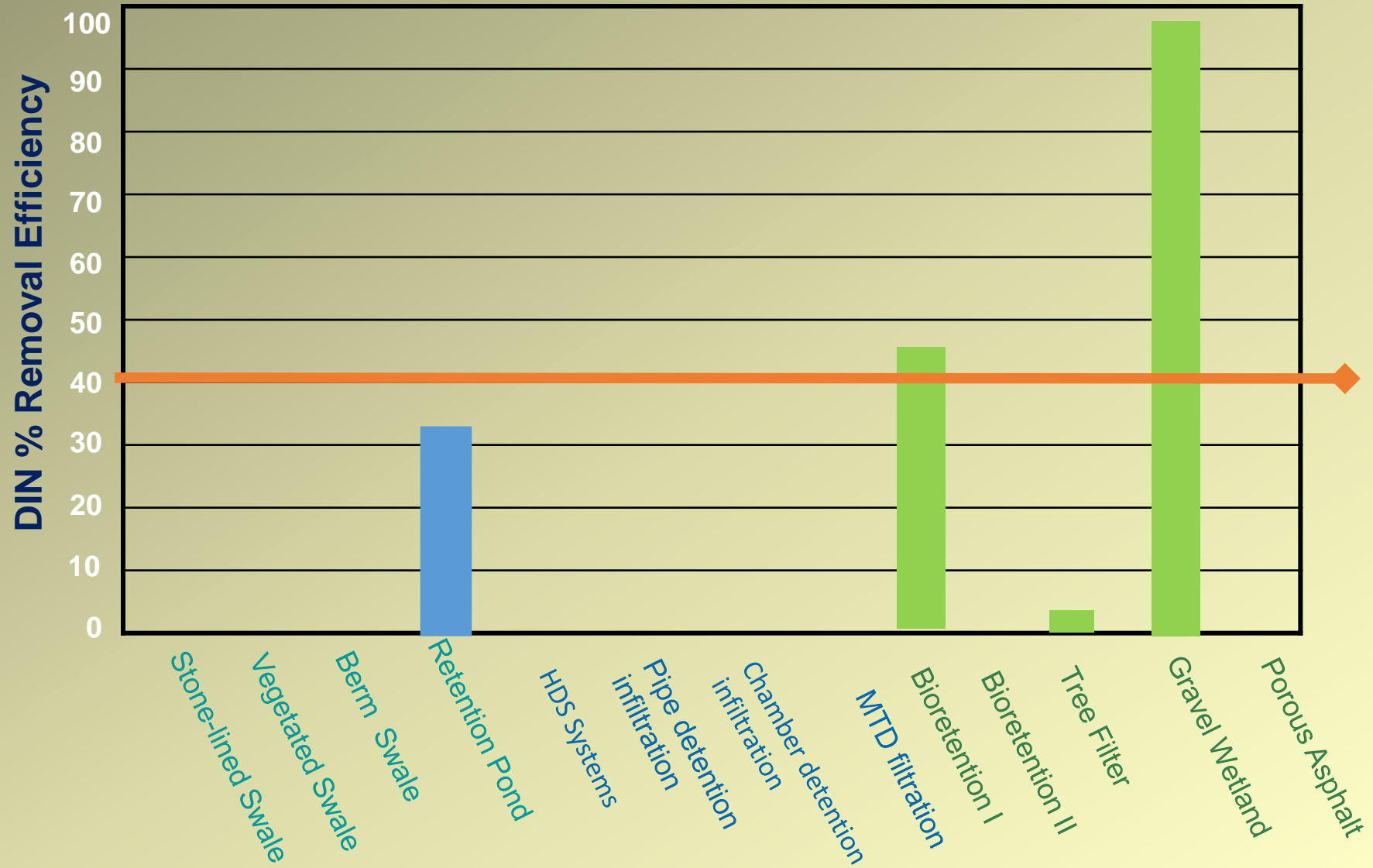
Tree Filter



# Total Suspended Solids (TSS) Removal Efficiencies



# DIN Removal Efficiencies





“High level treatment typically only occurs with the use of ***filtration systems***”:

***Eg. raingardens, bioretention, tree filters, bioswales, gravel wetlands***

# Preserve Effectiveness with Maintenance





# THANK YOU!

