

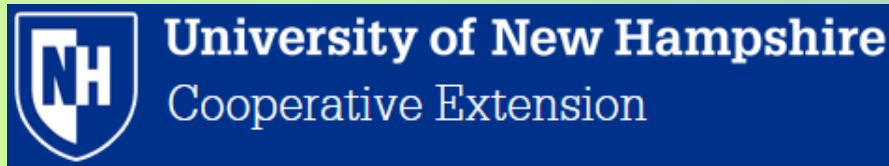
# Landscaping for Water Quality in the Lakes Region

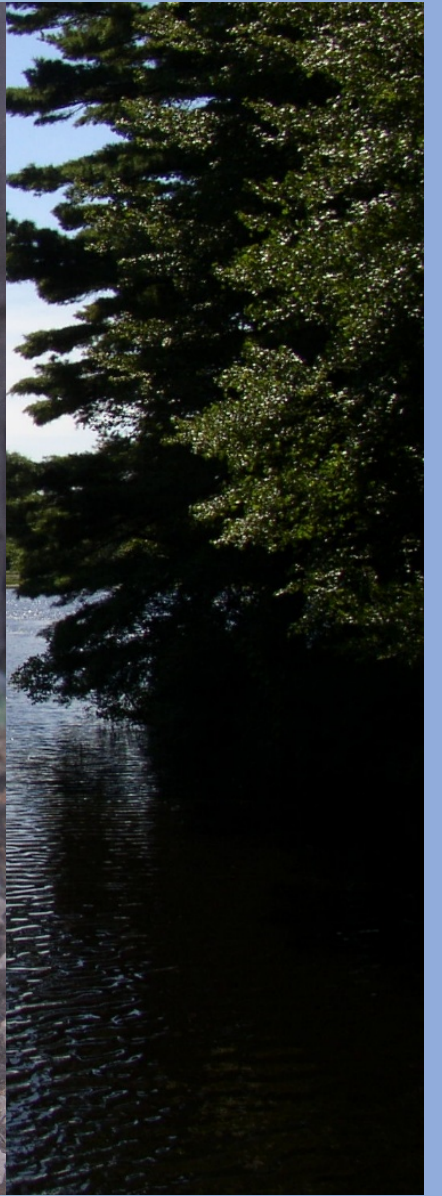
STORMWATER MANAGEMENT PRINCIPLES AND PRACTICES  
MARCH 2017

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N.H. Sea Grant and UNH Cooperative Extension

Moultonborough, 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)

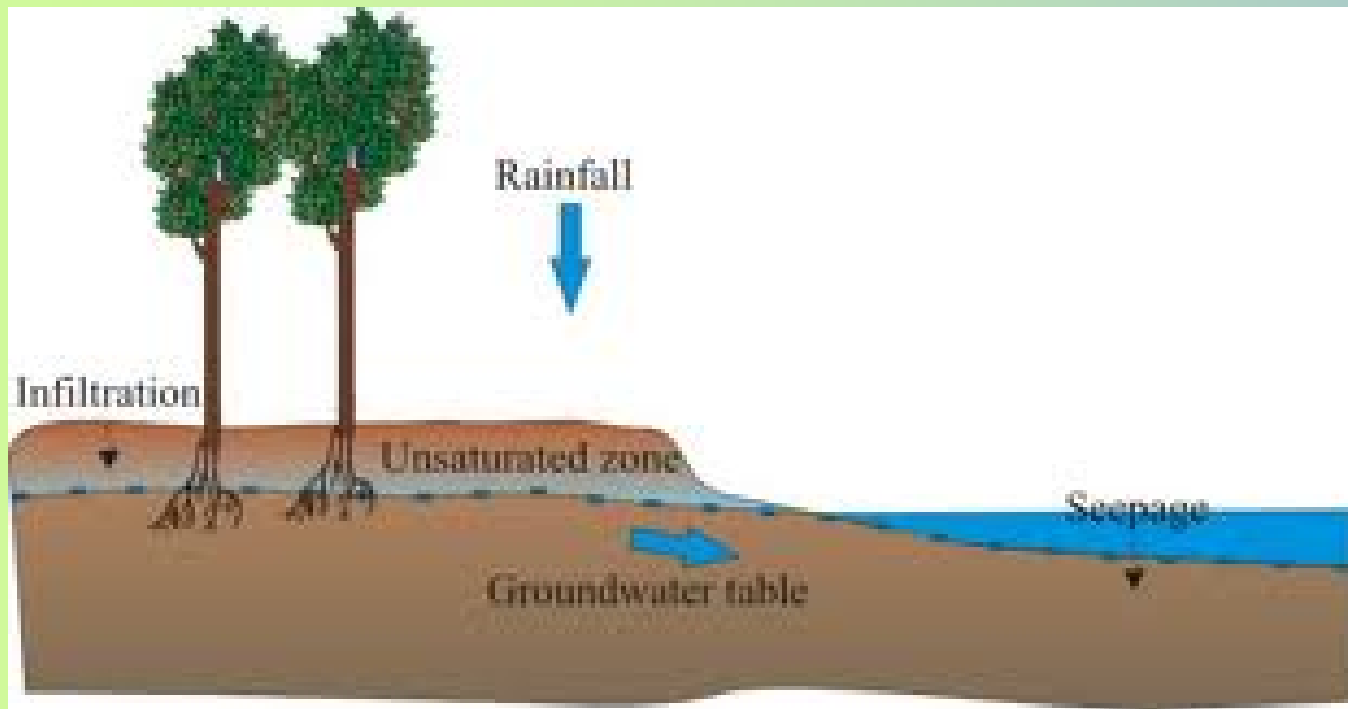


### Simple Recommendations for Every Lawn

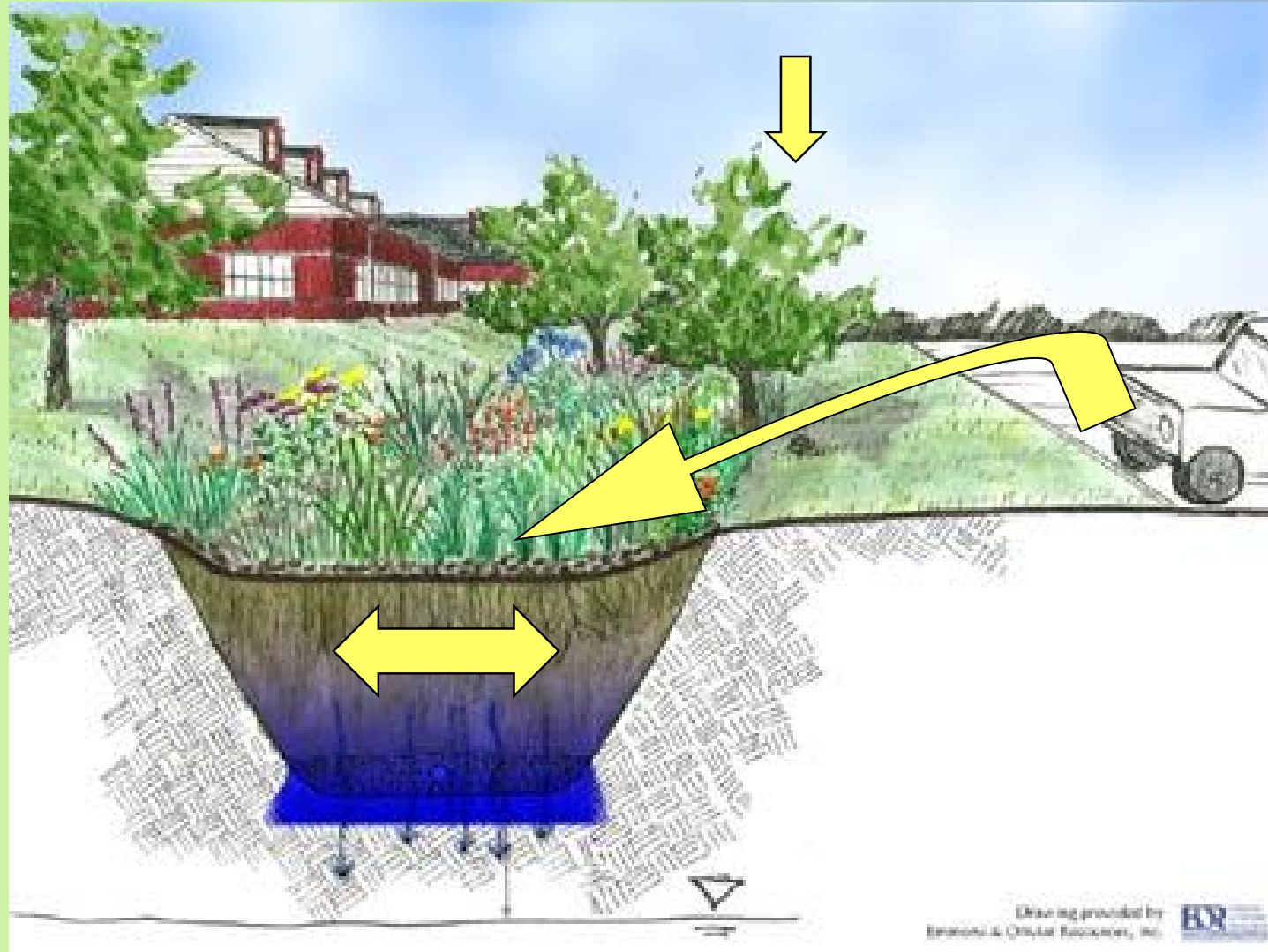


- 1. Choose the Right Grass Seed**
  - Consider limiting lawn area to locations where grass will grow easily and will actually be used for outdoor activities.
  - Choose grass varieties that require less maintenance. For northern New England, choose seed mixes with higher percentages of turf-type tall 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.

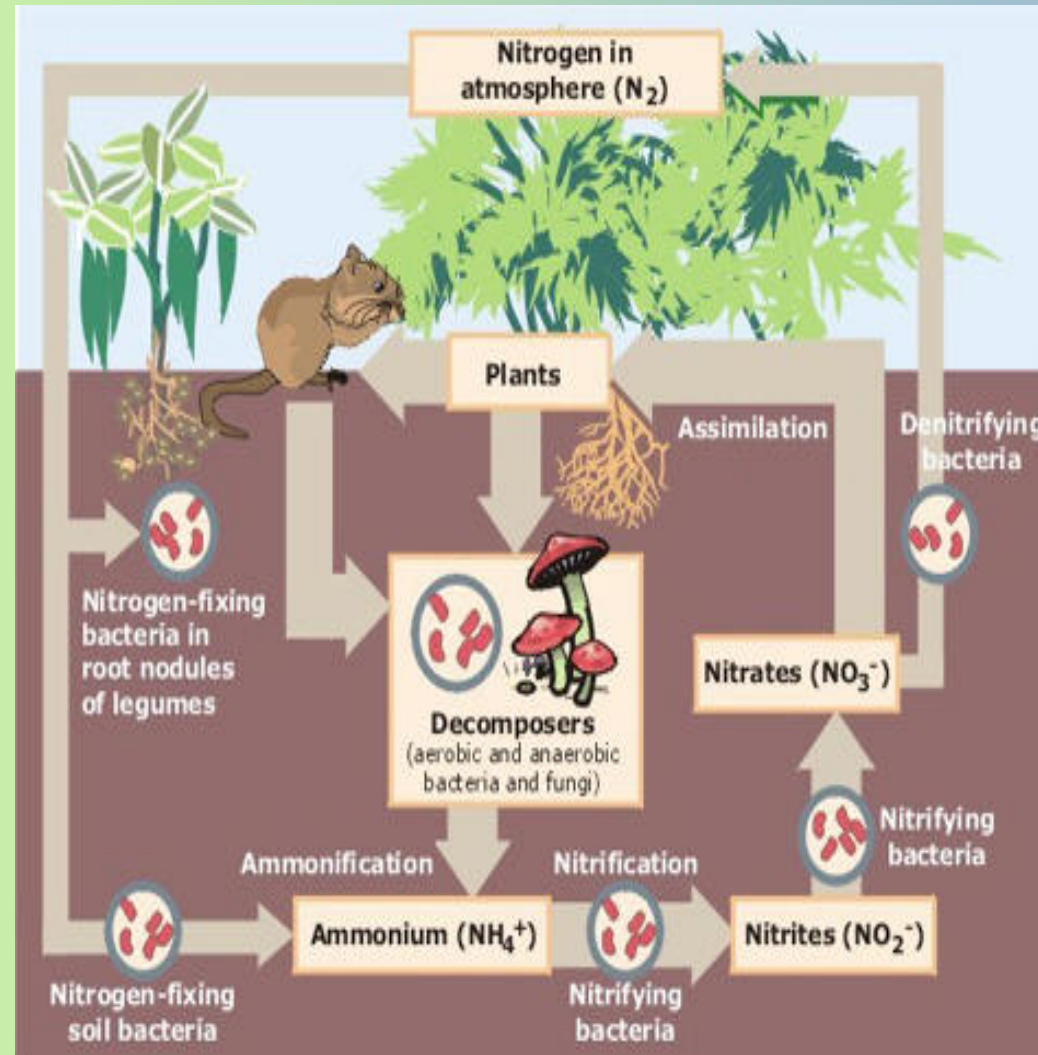
## 2. Promote INfiltration



# 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!





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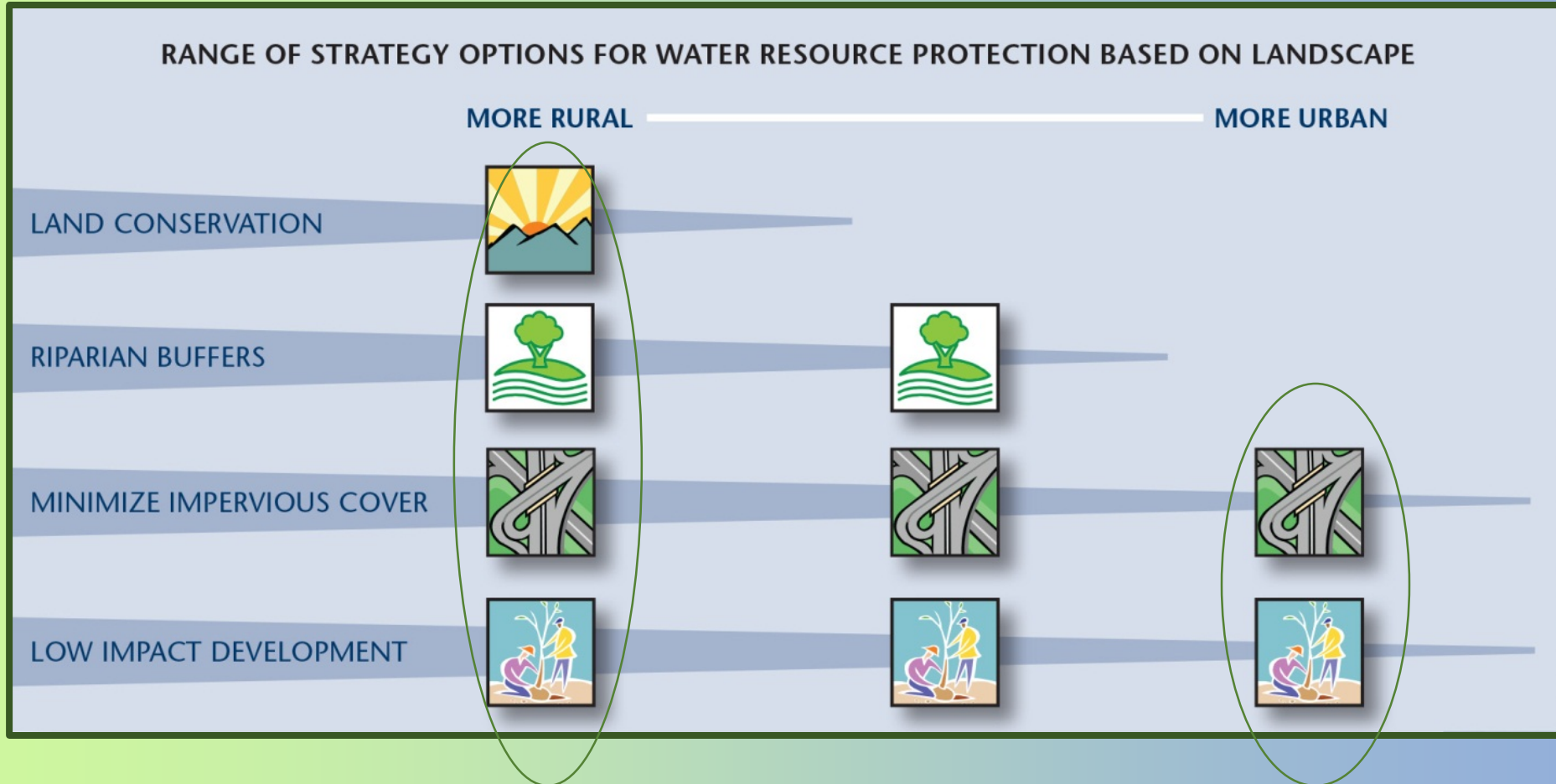
# What's a Landscaper to Do?



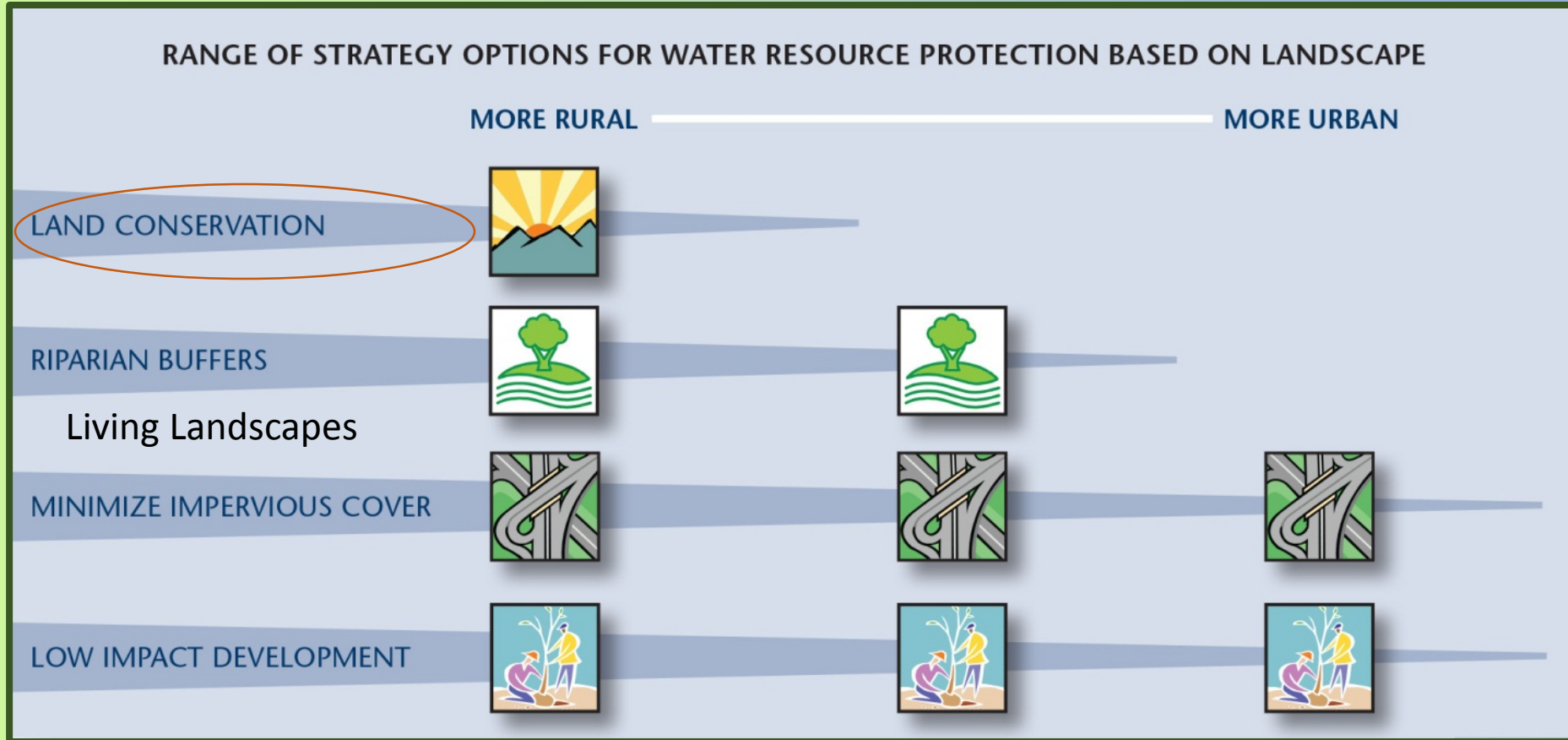
# Can Working at the Property Scale Make a Difference?



# 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

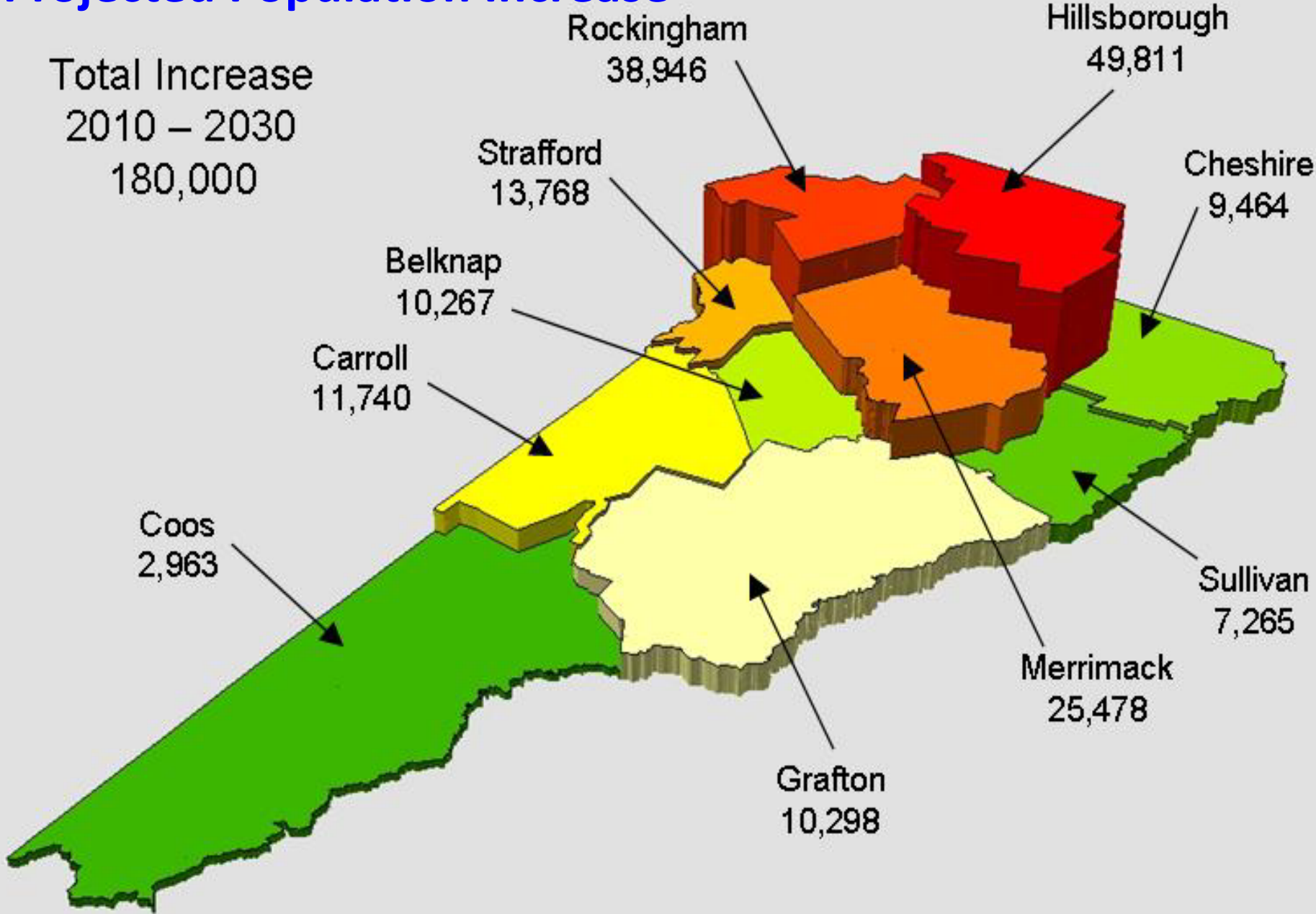
- Keeps natural systems intact
- Reduces flooding – provides infiltration
- Protects water quality - provides filtration

*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

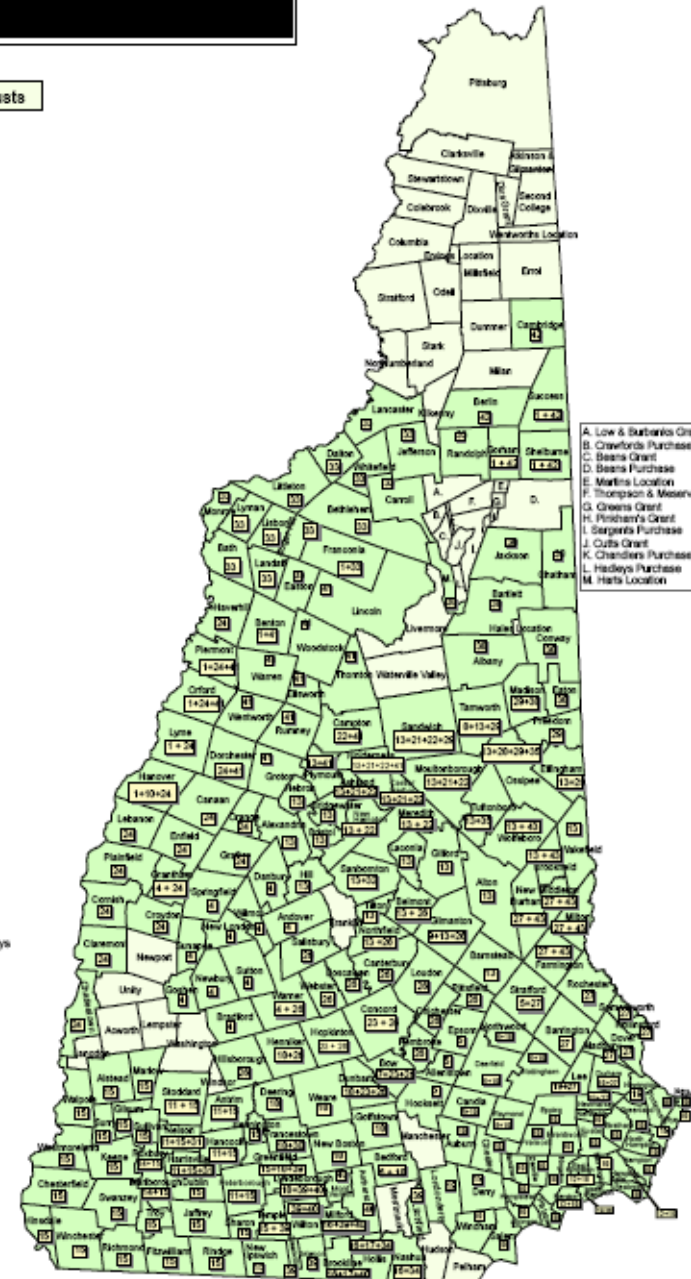
1 The Appalachian Trail Conf. Land Trust  
2 Audubon Sargent Land Preservation Trust  
3 Base-Paw Regional Greenways  
4 Bedford Land Trust  
5 Bow Open Spaces  
6 Chocomaus Lake Conservation Foundation  
7 Gilman Land Trust  
8 Hanover Conservancy  
9 Harris Center for Conservation Education  
10 Howland Trust  
11 Lakes Region Conservation Trust  
12 Marlborough-Roxbury Land Association  
13 Monadnock Conservancy  
14 Nichols-Smith Conservation Land Trust  
15 Nashua River Land Trust  
16 Piscataquis Land Conservancy  
17 Southeast Land Trust of NH  
18 Spauld County 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 Island Park Land Trust  
25 Green Mountain Conservation Group  
26 Franconia Land Conservation Inc.  
27 Silver Lake Land Trust  
28 Saranac Agriculture and Land Trust  
29 Merrimack Conservancy Trust  
30 Nashua River Watershed Association  
31 Dan Hole Pond Watershed Trust  
32 Upper Saco Valley Land Trust  
33 Monadnock Community Land Trust  
34 Souhegan Valley Land Trust  
35 Peri-Saker Land Trust  
36 Malcoosuc Land Trust  
37 Moose Mountains Regional Greenways

#### Information not available

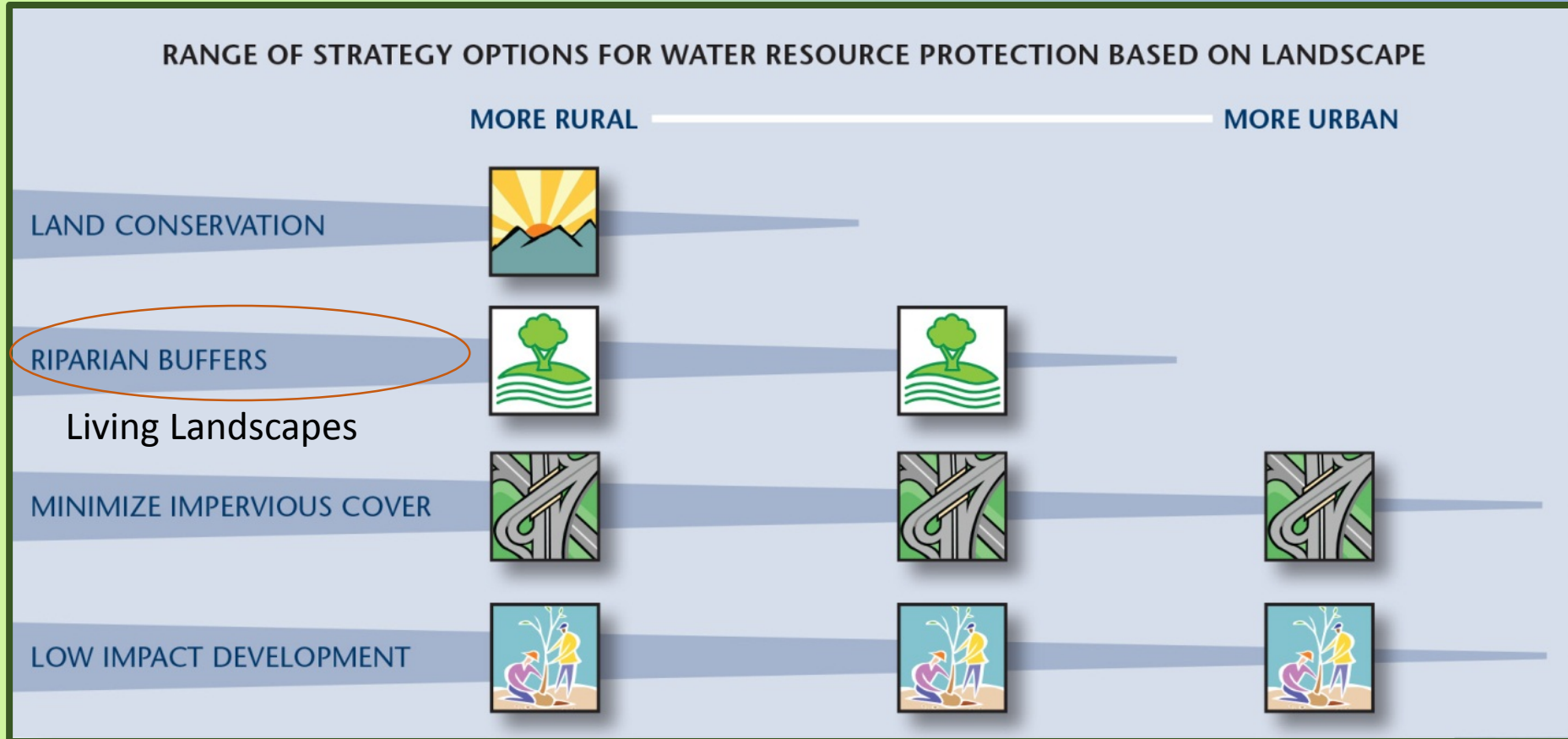
Ambert Land Trust  
Great Bay Resource Protection Partnership  
Highland Lake Association

Map produced by UMN Cooperative Extension  
Conservancy Conservation Assistance Program  
Contact Sharon Hughes for information (603) 923-1020

July 2012



# Clean Water Strategies



Graphic by Tricia Miller, MillerWorks Graphic Design

A photograph of a river flowing through a lush green forest, illustrating a riparian buffer. The river is surrounded by dense vegetation, including trees and shrubs, which form a natural barrier between the water and the surrounding land. The water is calm, reflecting the surrounding greenery. The sky is overcast, and the overall scene is peaceful and natural.

# 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 tall trees and a thick canopy. The water is clear and flows over several large, moss-covered rocks. The surrounding forest floor is covered in fallen leaves and more moss. The overall scene is a lush, green, and serene natural environment.

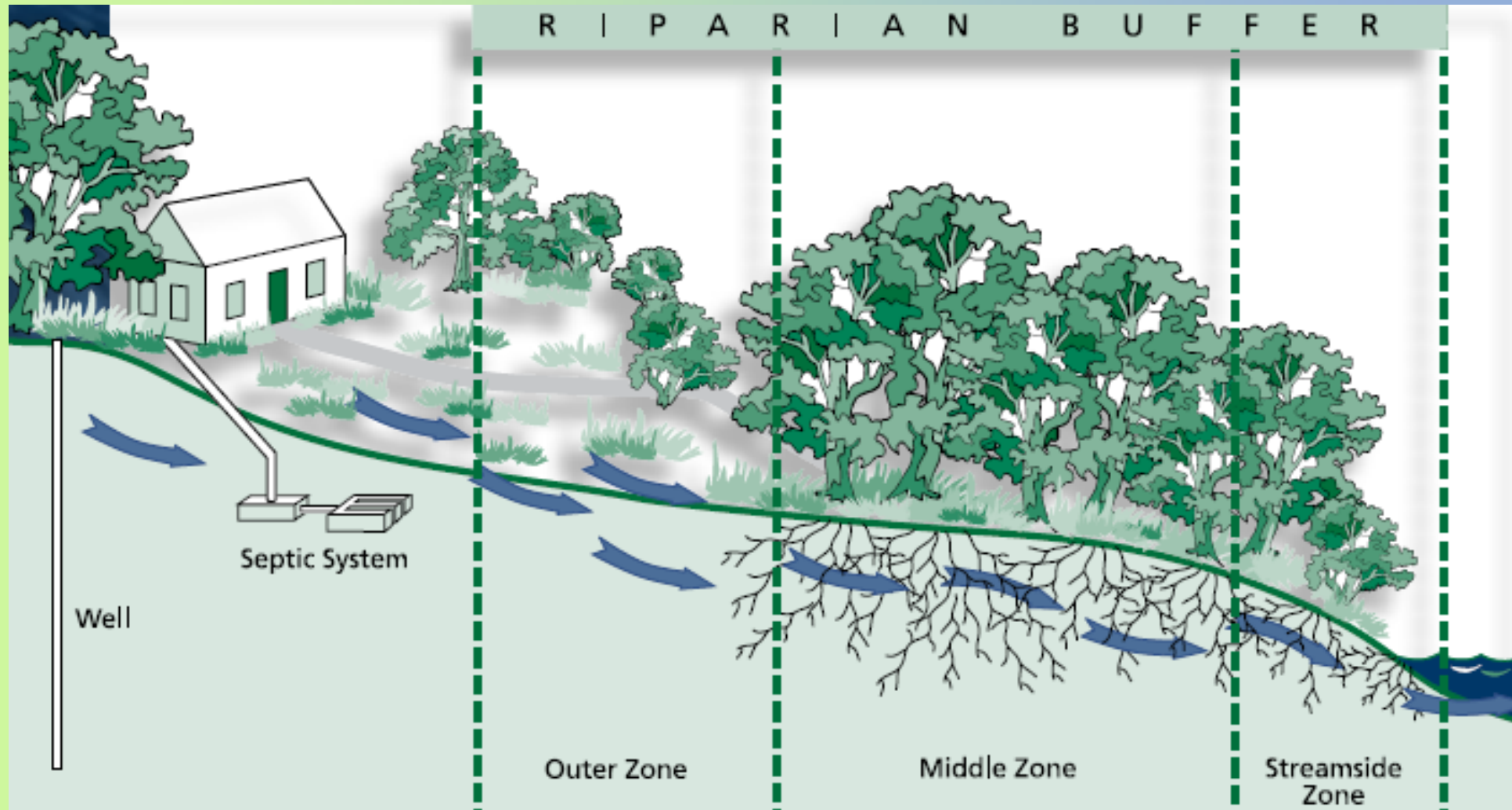
# Primary Benefits of Riparian Buffers

**Reduce flooding**

**Protect water quality**

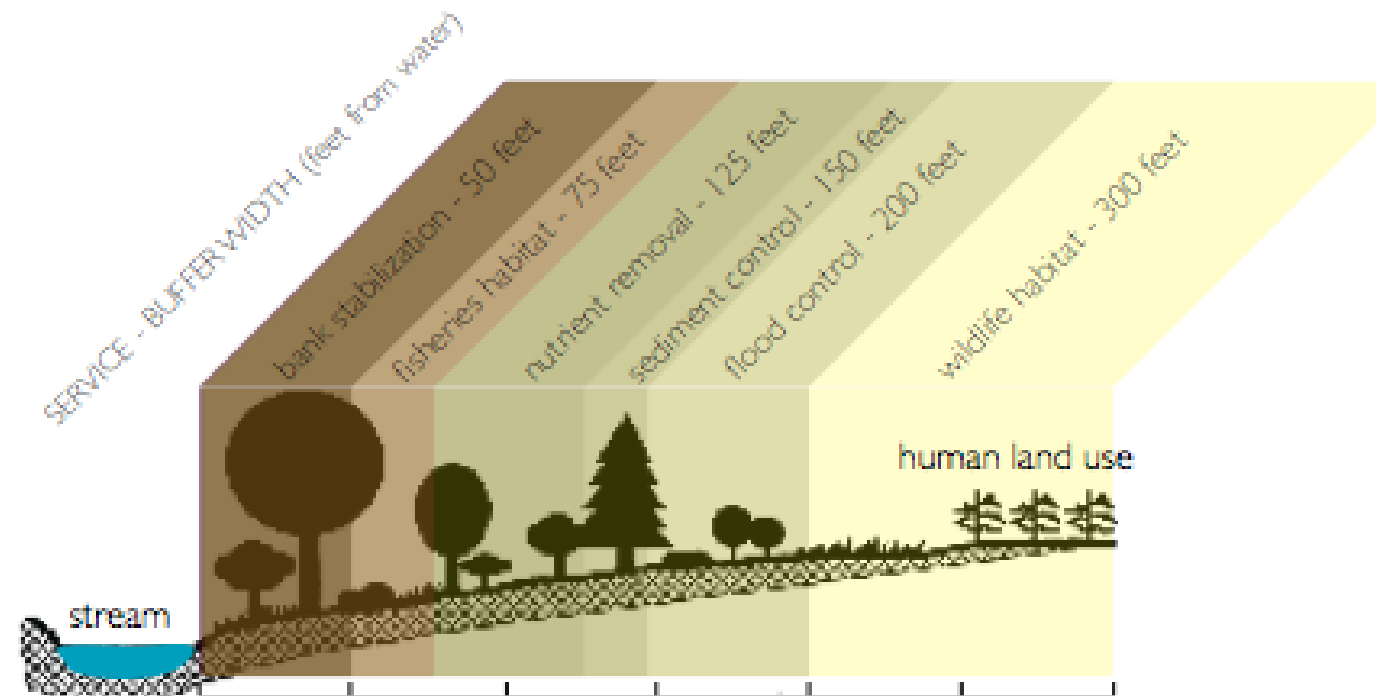
**Stabilize banks**

# Buffers can be naturally present OR planted and maintained



# Buffer Widths Affect Benefits

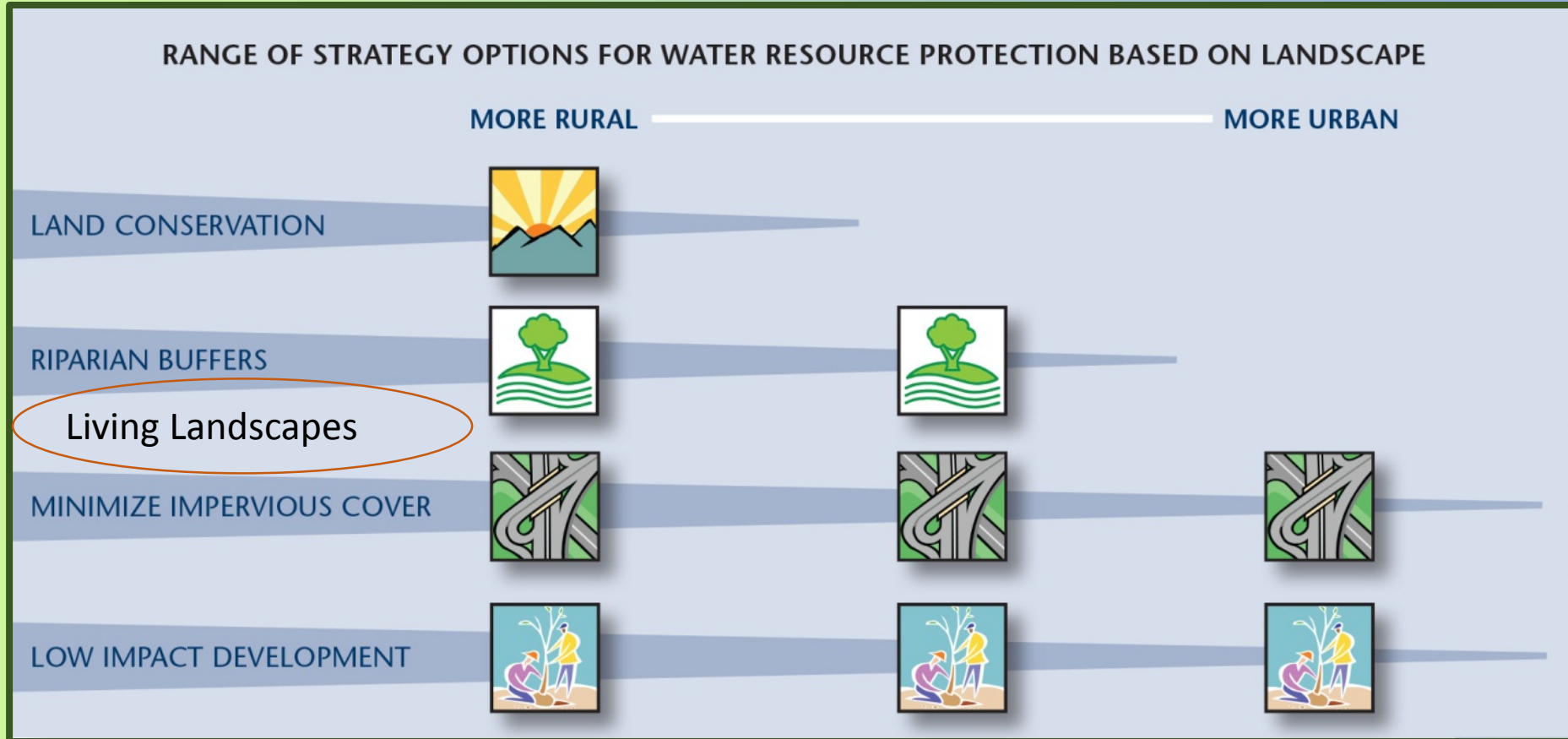
*Figure 5. Environmental Services Provided by Various Shoreland Buffer Widths*



*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



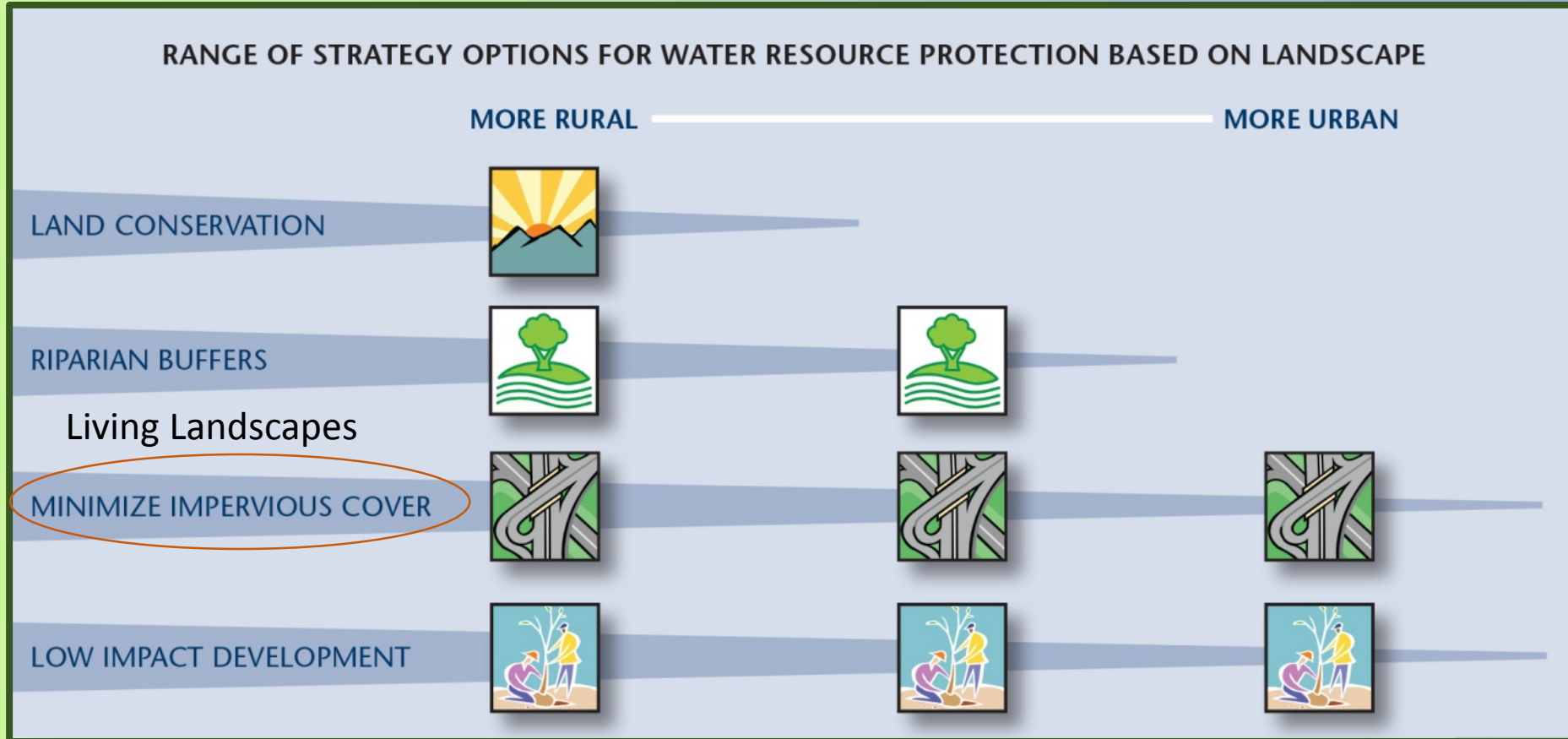


# Living Landscapes



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*



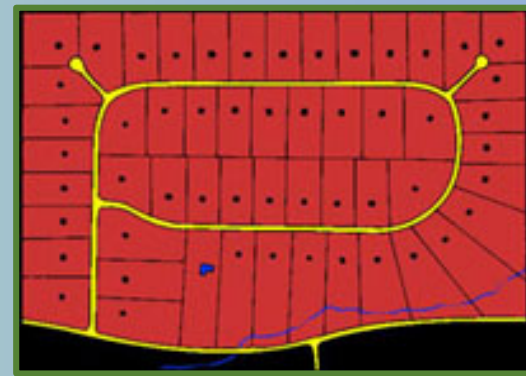
**Total IC=**

- ALL impervious cover within a catchment area

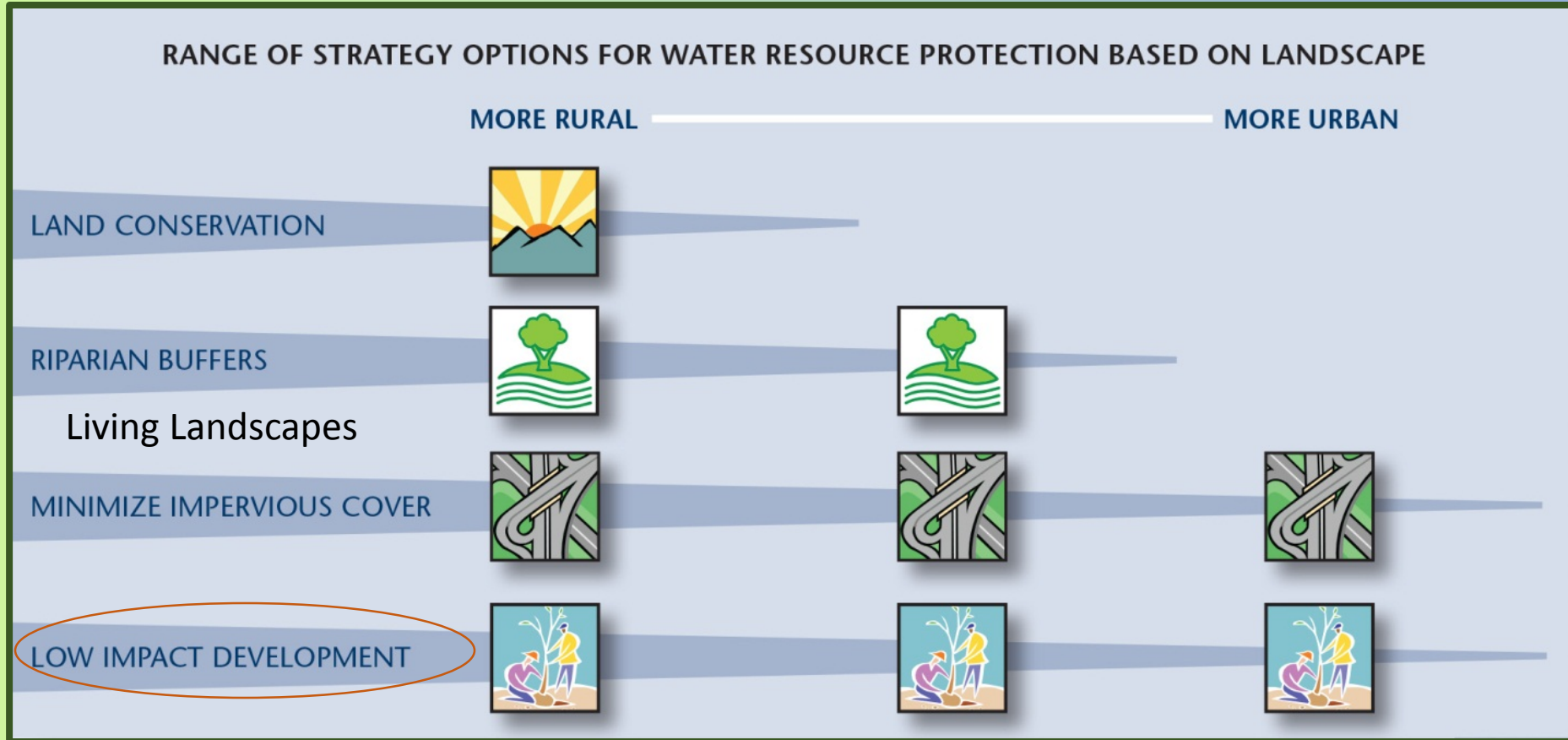
**Effective IC =**

- 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

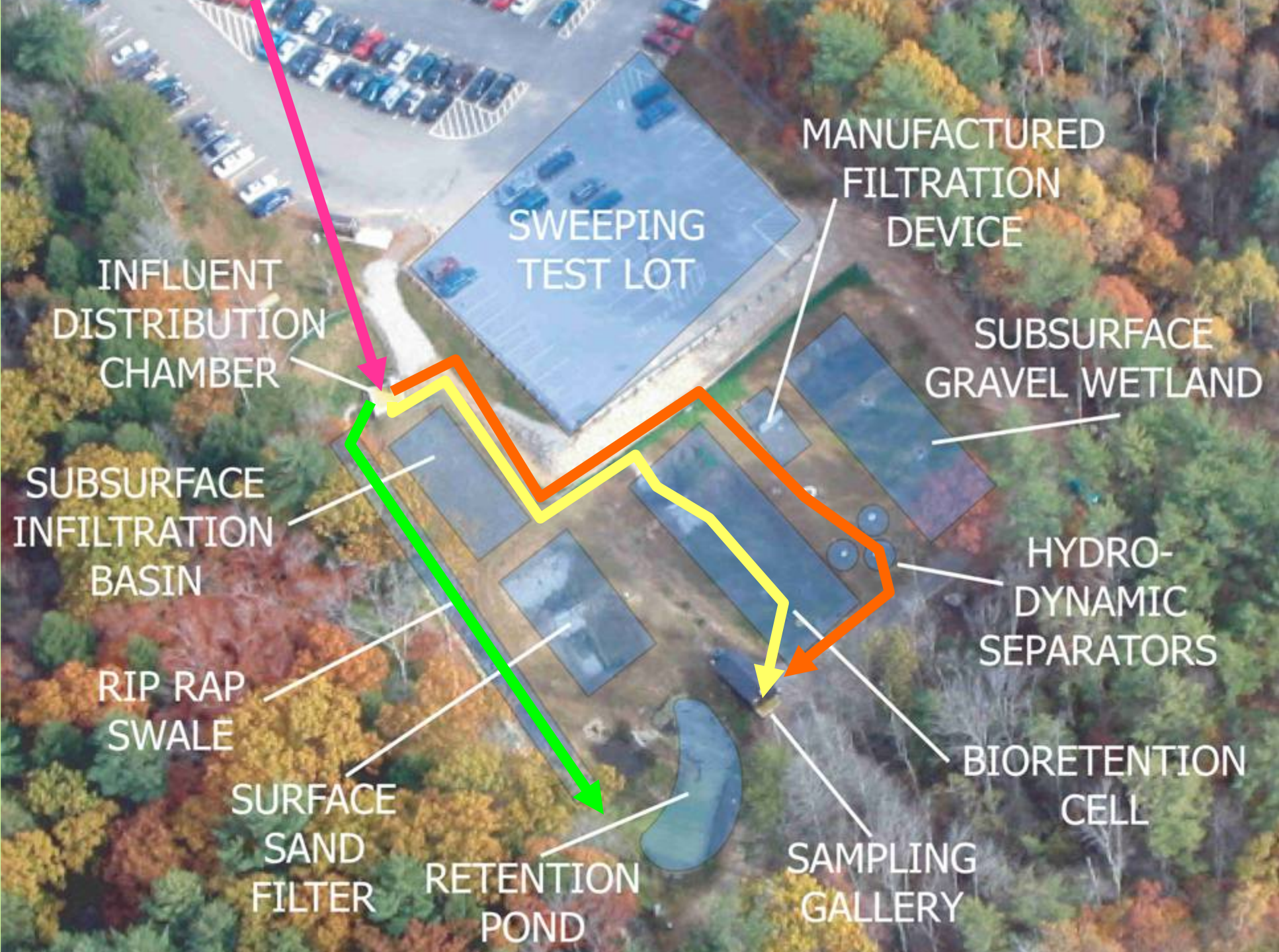
# Does Low Impact Development Work?

## Research Field Facility at UNH

Tc ~ 19 minutes









Hydrodynamic Separator



Isolator Row



Subsurface Infiltration



Filter Unit



Porous Asphalt



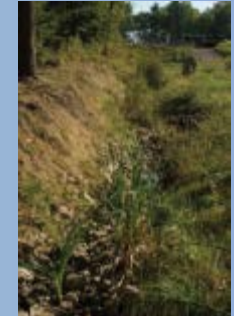
Pervious Concrete



Retention Pond



Stone Swale



Veg Swale



Gravel Wetland



Sand Filter

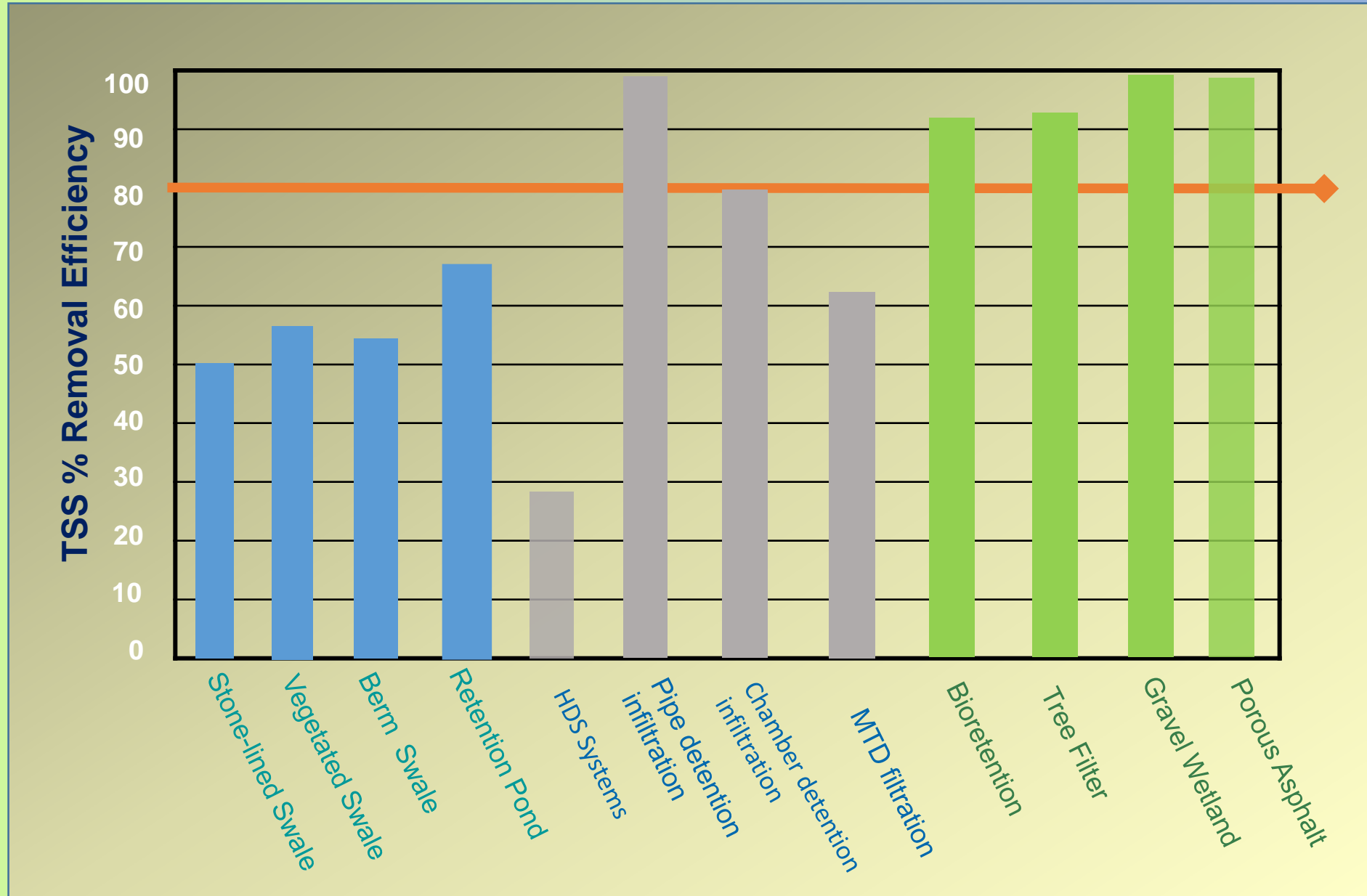


Bioretention Unit



Tree Filter

# Total Suspended Solids (TSS) Removal Efficiencies



“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!

