

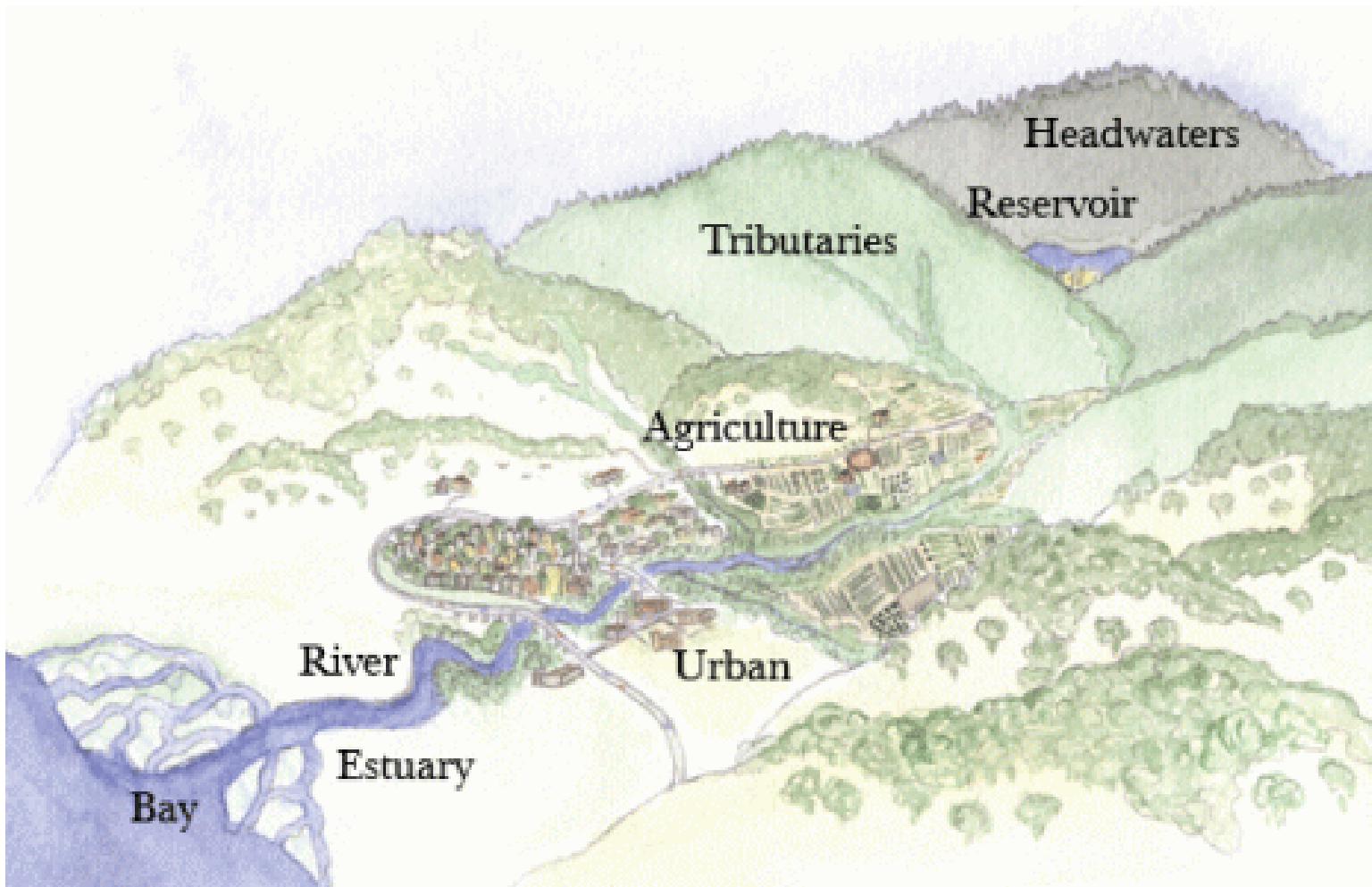
# How Land Use Effects Your Watershed and Pollution Solutions



Shannon McManus

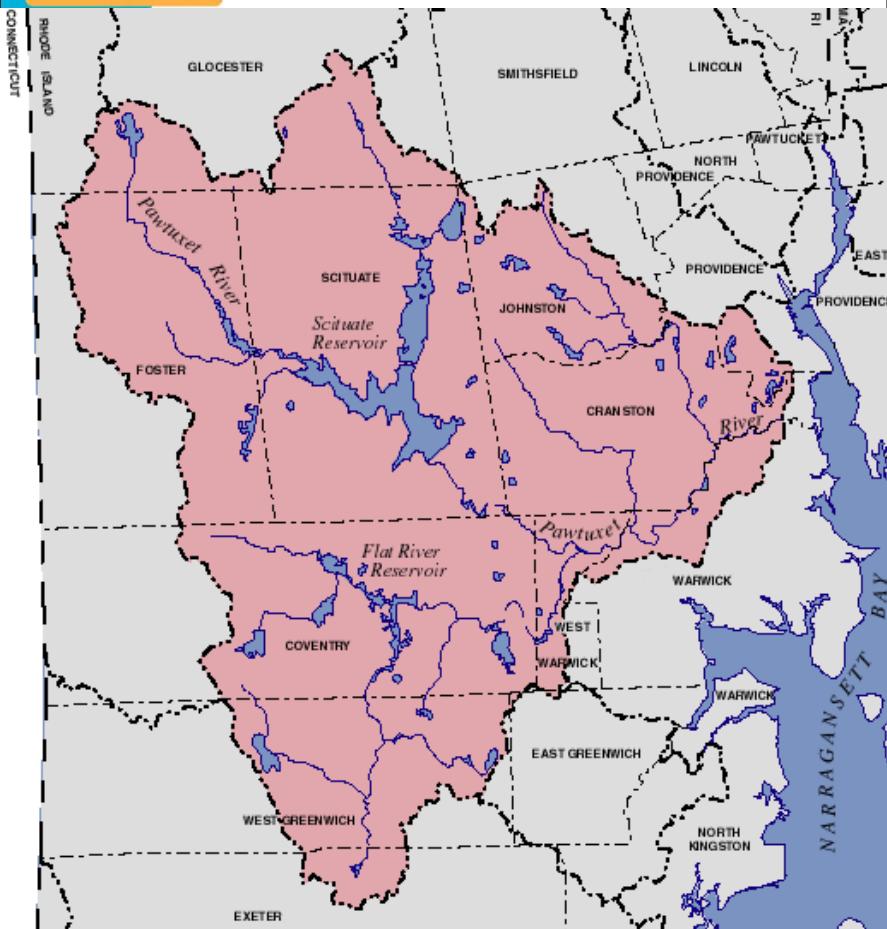
RI Non-point Education for Municipal Official  
University of Rhode Island

# What is a Watershed?



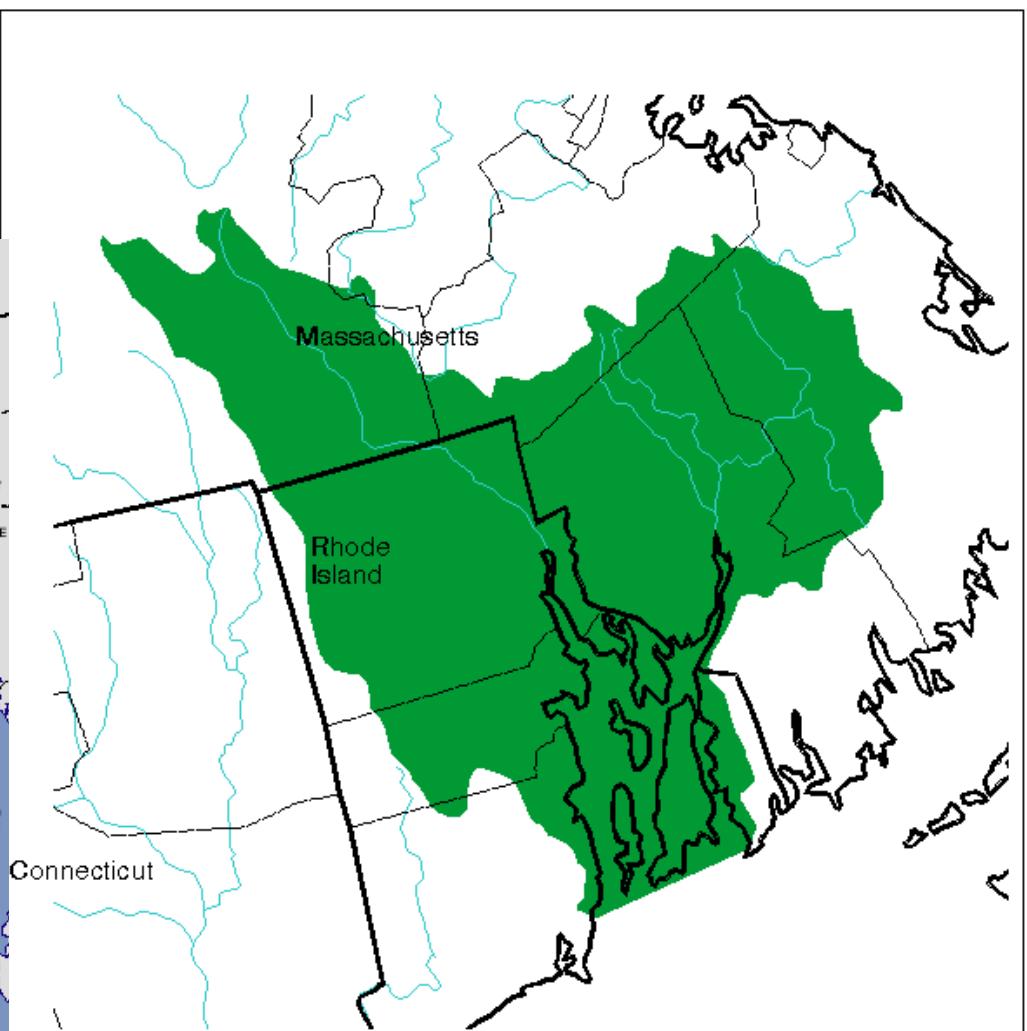
know where  
it goes

take simple  
steps to reduce  
STORMWATER POLLUTION



## Pawtuxet River Watershed

THE  
UNIVERSITY  
OF RHODE ISLAND



## Narragansett Bay Watershed

- Watershed
- Major Rivers
- State Boundary
- County Boundary

### Narragansett Bay

Scale: approximately 1:724,000  
Sources: NOAA, ARCUSA  
October 31, 1995  
Map MR00037-3

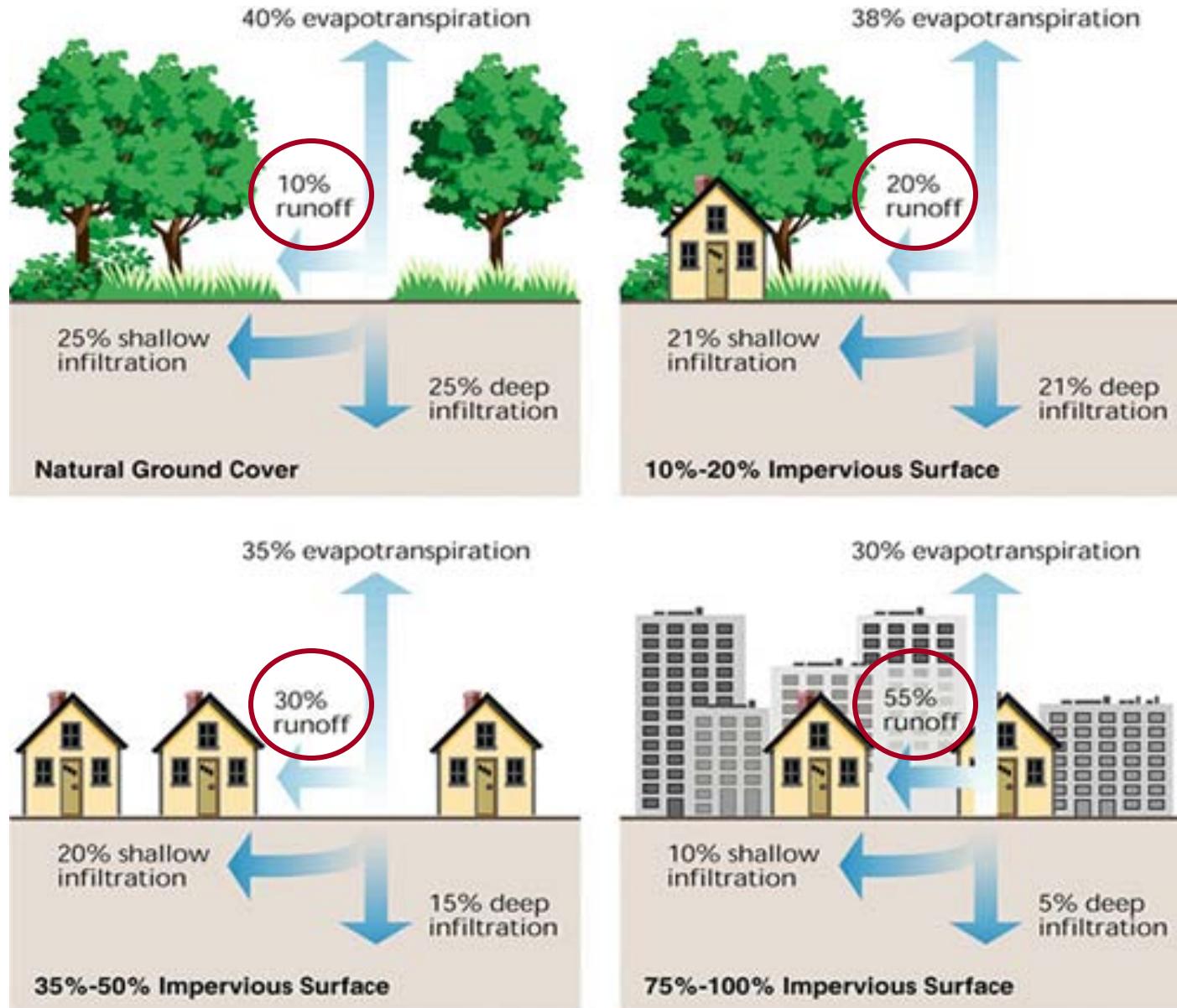
EPA  
Office of Wetlands, Oceans  
& Watersheds





# Residential Landscapes



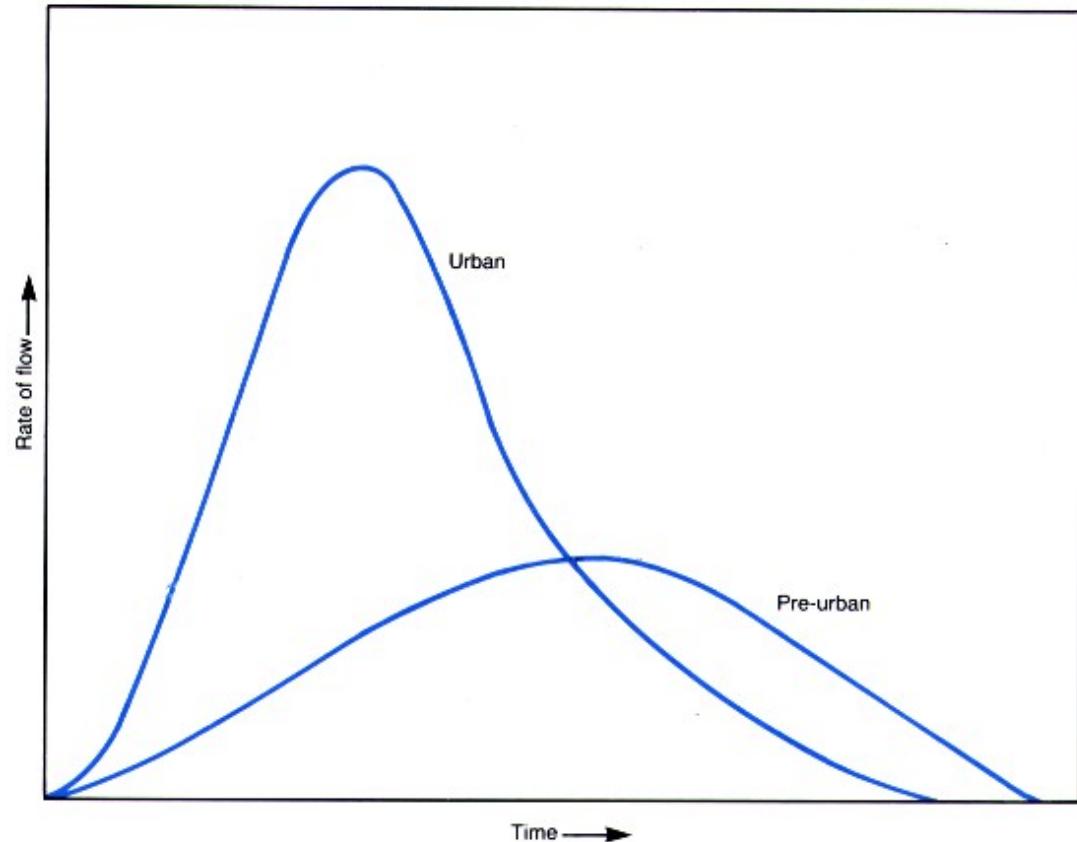


Picture taken from Minnesota Water: Let's Keep it Clean Act <http://www.cleanwatermn.org/resources/Hard-Surfaces.aspx>

# Problems with Stormwater Runoff:

EFFECTS OF URBANIZATION ON VOLUME AND RATES OF SURFACE RUNOFF

- Impervious surfaces cause water to flow much faster over the landscape than natural ground cover.



Urbanization increases peak flows and runoff volumes  
(the area under the curves)

*Adapted from Drainage Manual, Roads and Transportation Association of Canada, 1982.*



# Problems with Stormwater Runoff:



Source: R. Claytor File Photo

## Flooding



Warwick Mall. Photo source: examiner.com

# Problems with Stormwater Runoff:

- Decrease in Groundwater Recharge

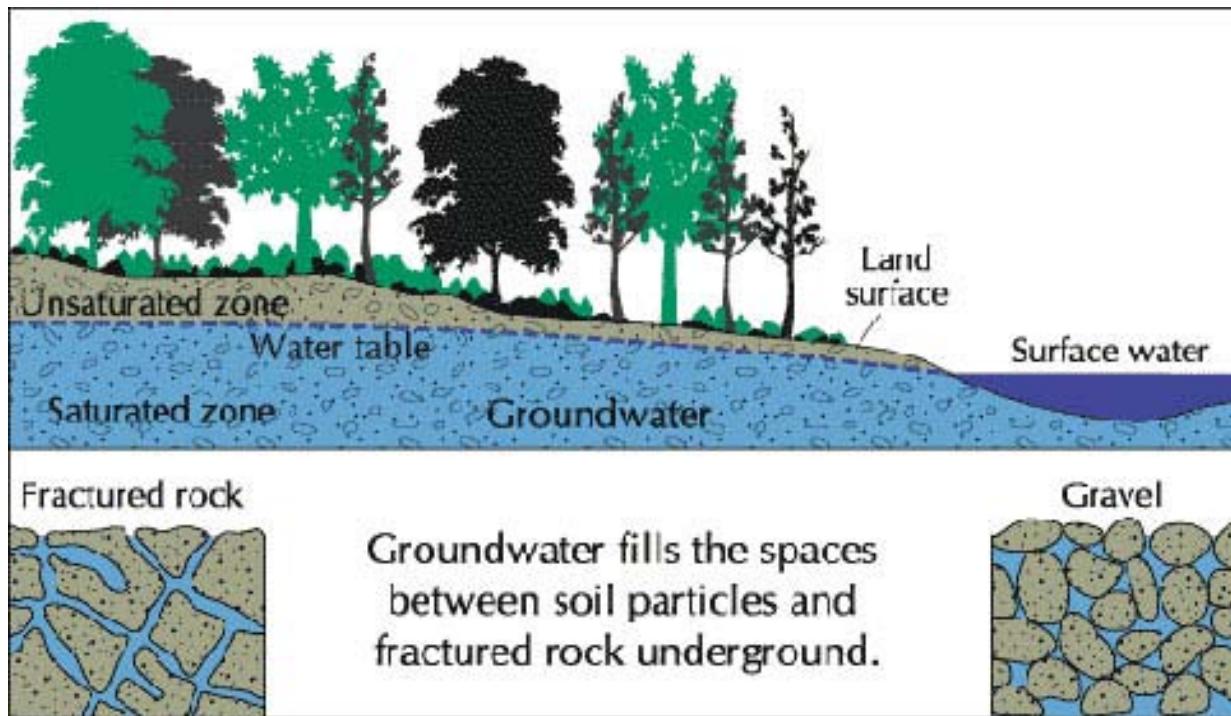


Image compliments of US Geological Survey, adapted by The Groundwater Foundation.



# Problems with Stormwater Runoff:

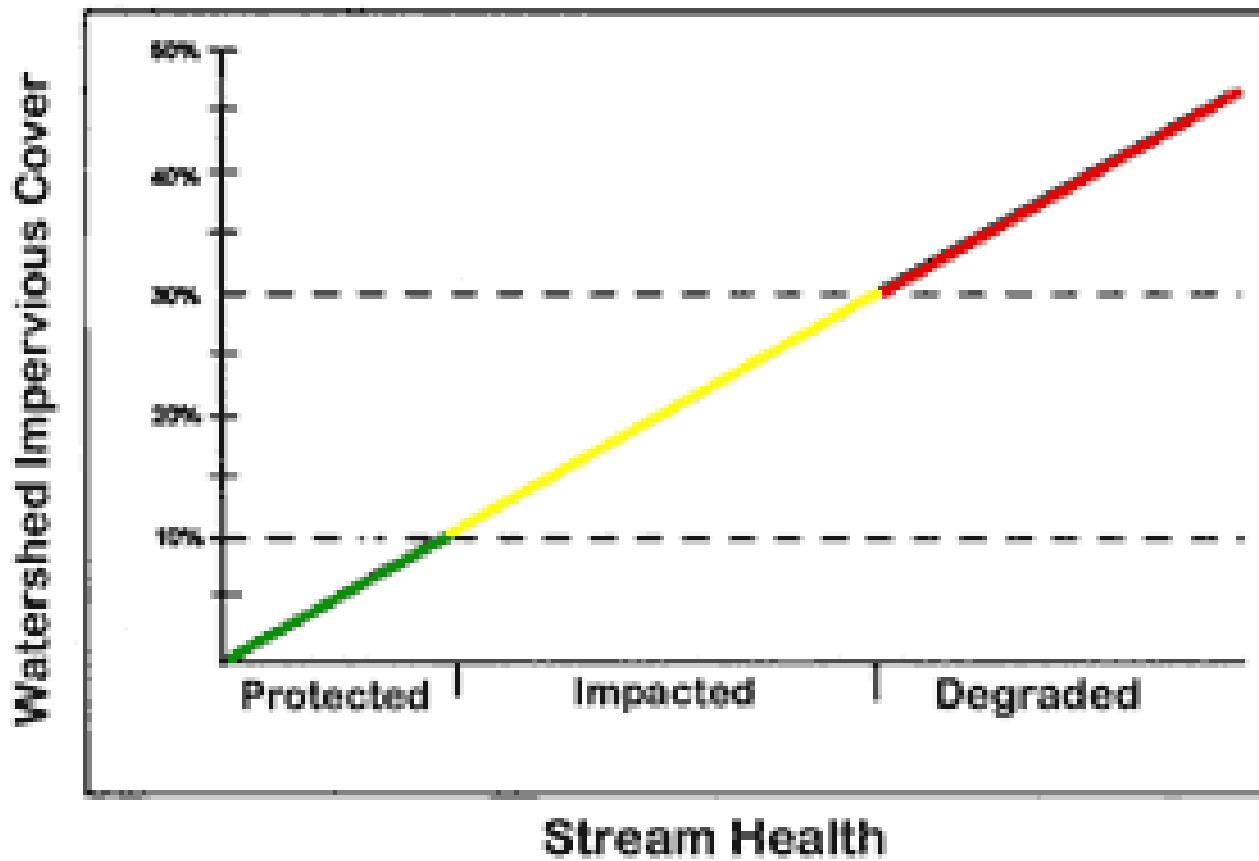
Runoff picks up pollutants and deposits them in local water bodies:

- Fertilizers and Pesticides
- Oils and heavy metals
- Sediments
- Animal wastes
- Litter
- Road Salts





## Relationship of Impervious Cover to Stream Health



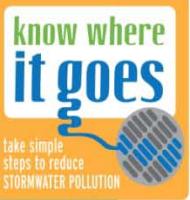


# Problems with Stormwater Runoff:

- Fishing and shell fishing closures
- Loss of biodiversity

*1000's of juvenile menhaden washed ashore during the 2003 fish kill in Greenwich Bay.*





# The Top 10 Solutions

## **Yard Care**

1. Never dump anything into the path of a stormdrain.
2. Sweep everything back onto the lawn.
3. Water wisely.
4. Divert rooftop runoff.
5. Reduce fertilizer and pesticide use.

## **Home Care**

6. Never put hazardous household wastes down stormdrains, indoor drains, or the trash.
7. Have your septic system inspected every year and pumped every 3-5 years.

## **Auto Care**

8. If you change your own motor oil, recycle the used oil.
9. Wash your vehicle at a designated car wash or on grass.

## **Pet Care**

10. Scoop your dog's poop. Then throw it in the trash.

**[www.RIStormwatersolutions.org](http://www.RIStormwatersolutions.org)**



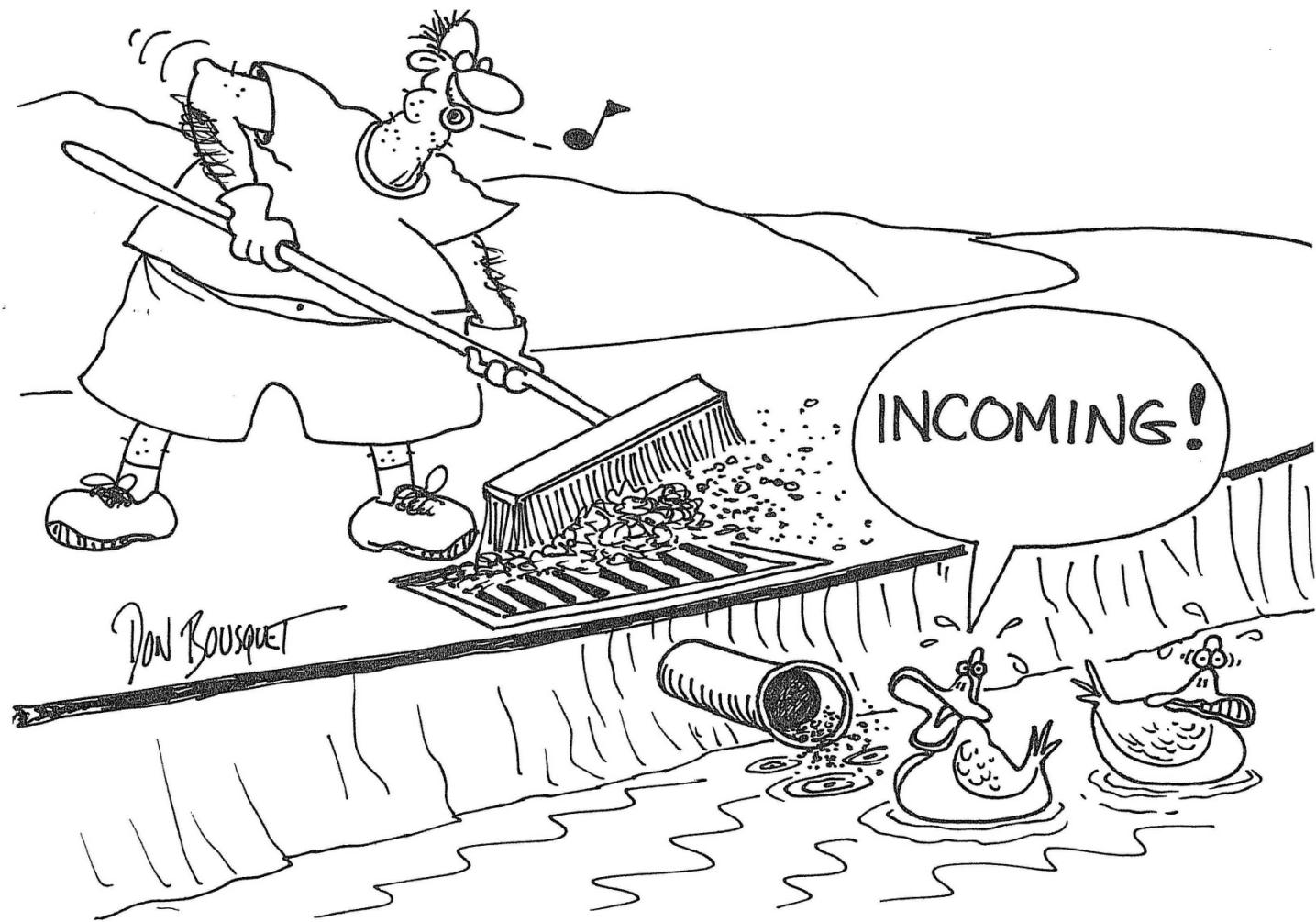
# The Two to Live By



- Keep as much water as possible off of paved surfaces.
- Keep the water that does run off as clean as possible.



# Stormwater Pollution





# Go to the Car Wash





# Pet Waste Management

Pet waste is a potential source of nutrients and pathogens.



Do not locate animals or waste near wells, storm drains or surface waters.





take simple  
steps to reduce  
STORMWATER POLLUTION

# Statewide Stormwater Education

RI

File

http://www.ristormwatersolutions.org/

Most Visited Custom Links Free Hotmail Windows Marketplace Windows Media Windows ELC\_BSDpart1.pdf (a... University of Rhode Island Mail - Water... Gmail - Inbox (1) - shanmc4480@gmail.com RI Stormwater Solutions How to Take a Snapshot of a Windows ...

**Rhode Island Stormwater Solutions**

Stormwater Basics | Take Action | Workshops & Events | Resources | About the Project | Statewide Campaign

Home | Contact Us

**Features**

The 2010 RI Stormwater Design and Installation Standards Manual has been adopted! Please visit our [workshops page](#) for information about trainings related to the new manual.

How do stormwater BMPs affect Santa? [Find out here!](#)

Wednesday Feb 9, 2011

Kingston, RI

25°F Partly Cloudy

Hour-by-hour | 10-day

weather.com

Enter city or U.S.zip

**Simple Steps**

 Don't dump into stormdrains

 Water wisely

 Fertilize sparingly

 Sweep fertilizer back onto lawn

 Scoop the poop

 Recycle rainwater

**Stormwater In the News**



# Statewide Stormwater Education

RI Stormwater Solutions - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.ristormwatersolutions.org/SW\_strategies.html#educationalresources

Most Visited Customize Links Free Hotmail Windows Marketplace Windows Media Windows ELC\_BSDpart1.pdf (a... University of Rhode Island Mail - Inbox ... Gmail - Inbox (1) - shanmc4480@gmail.... RI Stormwater Solutions

## Youth Education - Resources for Teachers and Students

### EnviroScape Model Materials

[Borrowing Enviroscape Model \(for classroom or festival use\) \(PDF\)](#)  
[RI Stormwater Solutions Lesson Plan to accompany EnviroScape Model \(PDF\) \(docx\)](#)  
[Enviroscape Methods – Pics \(PDF\)](#)  
[Oil Spill Activity from Enviroscape \(PDF\)](#)

### Planning or Finding Stormwater Education Programs

[List of Stormwater Education Programs in Rhode Island \(PDF\) \(MS Word\)](#)  
[Stormwater Concepts for School and Youth Programs \(PDF\) \(MS Word\)](#)  
[Project WET - Water Education for Teachers](#)  
[Enviroscape Model \(for classroom or festival use\) \(PDF\)](#)

### Lesson Plans and Curricula

[Build A Watershed Model: Understanding Nonpoint Pollution – Teacher Resource \(PDF\) \(MS Word\)](#)  
[Build A Watershed Model: Understanding Nonpoint Pollution – Student Sheet \(PDF\) \(MS Word\)](#)  
[How Does It Flow and Where Does It Go? – Teacher Resource \(PDF\) \(MS Word\)](#)  
[How Does It Flow and Where Does It Go? – Student Sheet \(PDF\) \(MS Word\)](#)  
[Instructions for Assembling the Stormwater Education Poster \(PDF\) \(MS Word\)](#)  
[Poster Narration \(PDF\) \(MS Word\)](#)  
[Classroom Handouts: Water Cycle, Stormdrains, Watersheds \(PDF\) \(PowerPoint\)](#)  
[The Stormwater Game: Instructions \(PDF\) \(PowerPoint\)](#)  
[The Stormwater Game: Assembling the Pieces \(PDF\)](#)  
[The Stormwater Activity Book \(PDF\)](#)  
[Active Watershed Curriculum: Effects of Land Use on the Watershed \(Grades 4-8 - adaptable for all grades\) \(PDF\)](#)  
[Active Watershed Curriculum: Intro to Water Quality Issues \(PDF\)](#)  
[Active Watershed Curriculum: Testing Out an Aquifer](#)

NRICD- Rain Garded Service Project

Done

start RI Stormwater... John Magrans... Project Site Specific Soil Microsoft O... Stormwater Ta... presentation.p... nh-vt.pdf - Ad... 11:24 AM

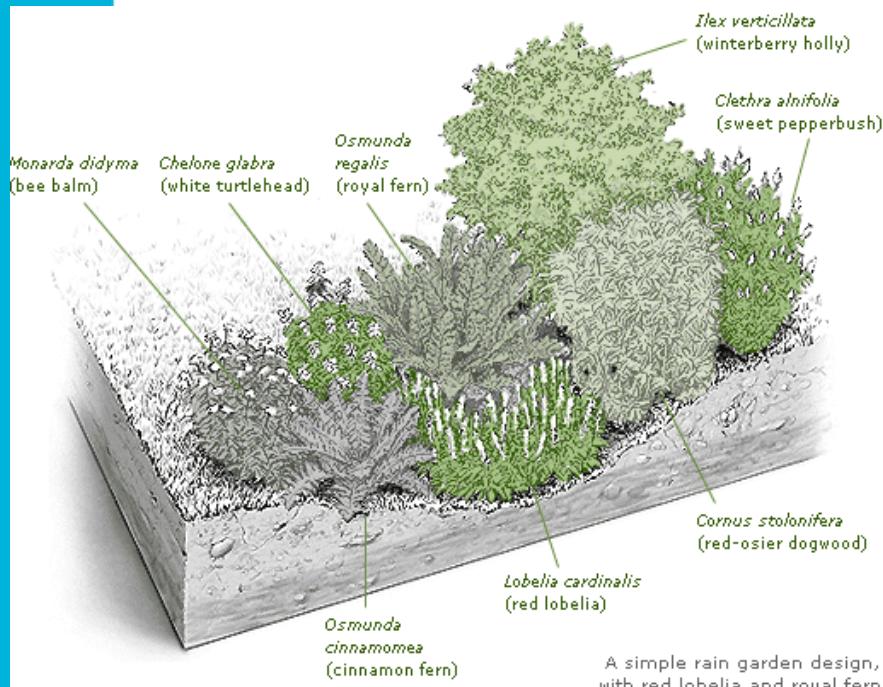
ri stormwatersolutions.org



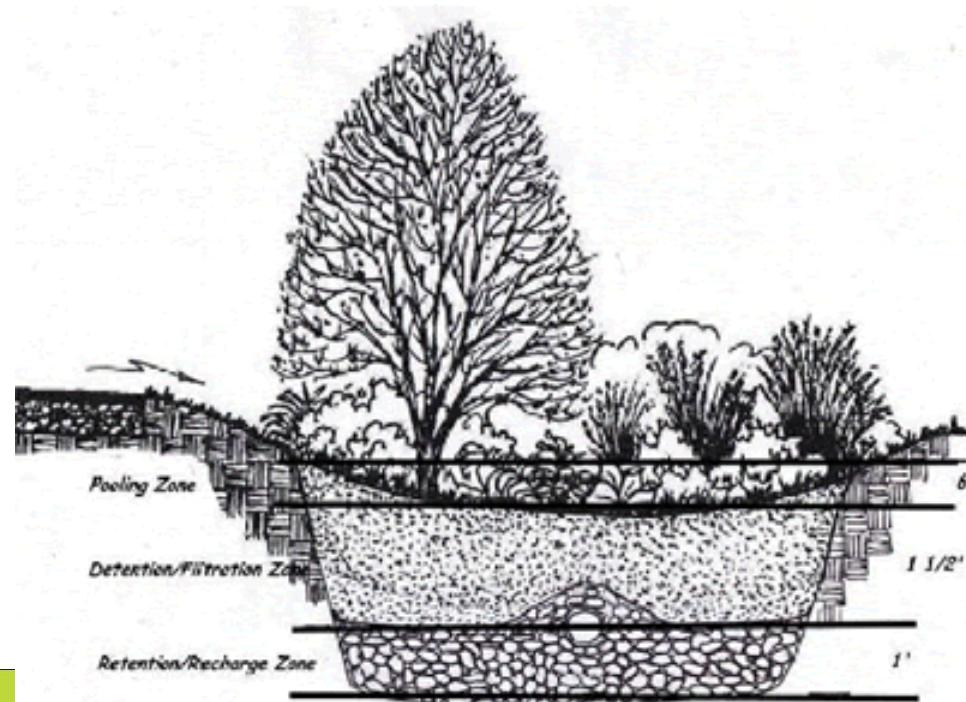
# Build a Rain Garden Project



A natural or dug shallow depression designed to capture and soak up stormwater runoff from your roof or other impervious areas around your home like driveways, walkways, and even compacted lawn areas.



A simple rain garden design, with red lobelia and royal fern occupying the lowest, wettest zone.





## What is a Rain Garden?

A rain garden is an attractive native plant garden with a special purpose: to capture, soak up and filter stormwater runoff from roofs, driveways, parking lots and other impervious surfaces before it enters local lakes, ponds, rivers or bay. Rain gardens use the concept of bioretention; a water quality practice in which plants and soils remove pollutants from stormwater naturally.



## Why Should You Create a Rain Garden?



In addition to adding beauty to your community, rain gardens can also help protect water quality, by reducing stormwater runoff. Stormwater runoff is considered one of the main sources of water pollution nation-wide. As watersheds become developed, rainwater quickly runs off paved surfaces such as roofs, parking lots and driveways increasing flooding while picking up and carrying pollutants into storm drains and surface waters.

By reducing stormwater runoff, rain gardens can be a valuable part of changing these trends. While an individual rain garden may seem like a small contribution, collectively they produce substantial environmental benefits. Rain gardens work for us in several ways:

- Increasing the amount of water that filters into the ground which recharges groundwater;
- Helping protect communities from flooding and drainage problems;
- Reducing erosion of stream banks;
- Helping protect surface waters from pollutants carried by stormwater such as lawn fertilizers and pesticides, oil and fluids that leak from cars, bacteria from pet waste, litter, among others;
- Enhancing the beauty of yards and neighborhoods;
- Providing habitat for birds, butterflies and other beneficial insects.

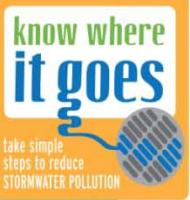
## Developing Your Goals and Work Plan

You may be installing a rain garden in a neighbor's yard, a local municipal property with high stormwater runoff, or a school in your community. Whatever the case, you will want to understand the goals of the project and develop a work plan accordingly. Some of your goals will be to:

- Reduce impacts of stormwater runoff in your community.
- Enhance awareness of stormwater runoff and non-point source pollution.
- Design, establish, and maintain an educational and sustainable landscape in your community.
- Promote environmental stewardship and community pride.



Your work plan should align with your goals. Whether you are working by yourself or with a group, organize each component of the project, and assign jobs to each participant. Your timeline will vary depending on how you set up your project. Finding the right location and funding your rain garden will be the main factor in determining timing. Develop a timeline based on the work plan tasks. Continue to



# LID Inventory

RI Stormwater Solutions - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.ristormwatersolutions.org/SW\_RI\_LIdtour.html

Most Visited M Customize Links F Free Hotmail Windows Marketplace Windows Media M Windows ELC\_BSDpart1.pdf (a... ri nemo

Search Facebook Amazon YouTube CNN Games Personas Celebrity E-mail Word of the Day Options

ri nemo University of Rhode Island Mail - Inbox ... Gmail - Inbox (2) shannmc480@gmail.com RI Stormwater Solutions

RI LID Inventory

LID Atlas

Full LID Description List

Low Impact Development Atlas

About The Site Contact Us

Filter Projects

- All Project Types 16
- Bioswale 13
- Bioretention/Rain Garden 13
- Cistern/Rain Barrel 12
- Green Filter Wetlands 12
- Green Roof 12
- Permeable Pavement 12
- Water Conservation 4
- Other 4

State: RHODE ISLAND

Town: All

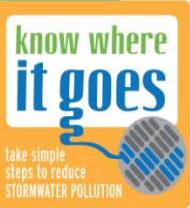
Land Use Type: All Types

Currently Showing (36 Projects)

- 117 Metro Center Blvd. Warwick, RI
- 17 Gordon Avenue Business Inc Providence, RI
- Aidan's Pub Bristol, RI
- Bentley's Tavern North Scituate, RI
- Blue Cross Building Providence Providence, RI
- Brown University's Lincoln Field Providence, RI
- Browns Farm Drive Subdivision Kingston, RI
- Conventry center Greenway Bik Coventry, RI
- FM Global Headquarters Johnston, RI
- Harbour Ridge Subdivision North Kingstown, RI
- Historic Ocean House Watch Hill, RI

Map Satellite Hybrid Terrain





# Thank You!

Visit: RIStormwaterSolutions.org  
to access these resources and learn more.

Contact me with any questions or to  
borrow the Enviroscape model

Shannon McManus

[shannon\\_mcmanus@my.uri.edu](mailto:shannon_mcmanus@my.uri.edu)

Or Call

401 – 874 – 5687