



**Your Land. Your Water. Your Solution.**

**Lakes Congress**

**Rain Gardens**

**May 31, 2019**



# **Soak Up the Rain NH**

**Rain Gardens Basics**

**Resources**

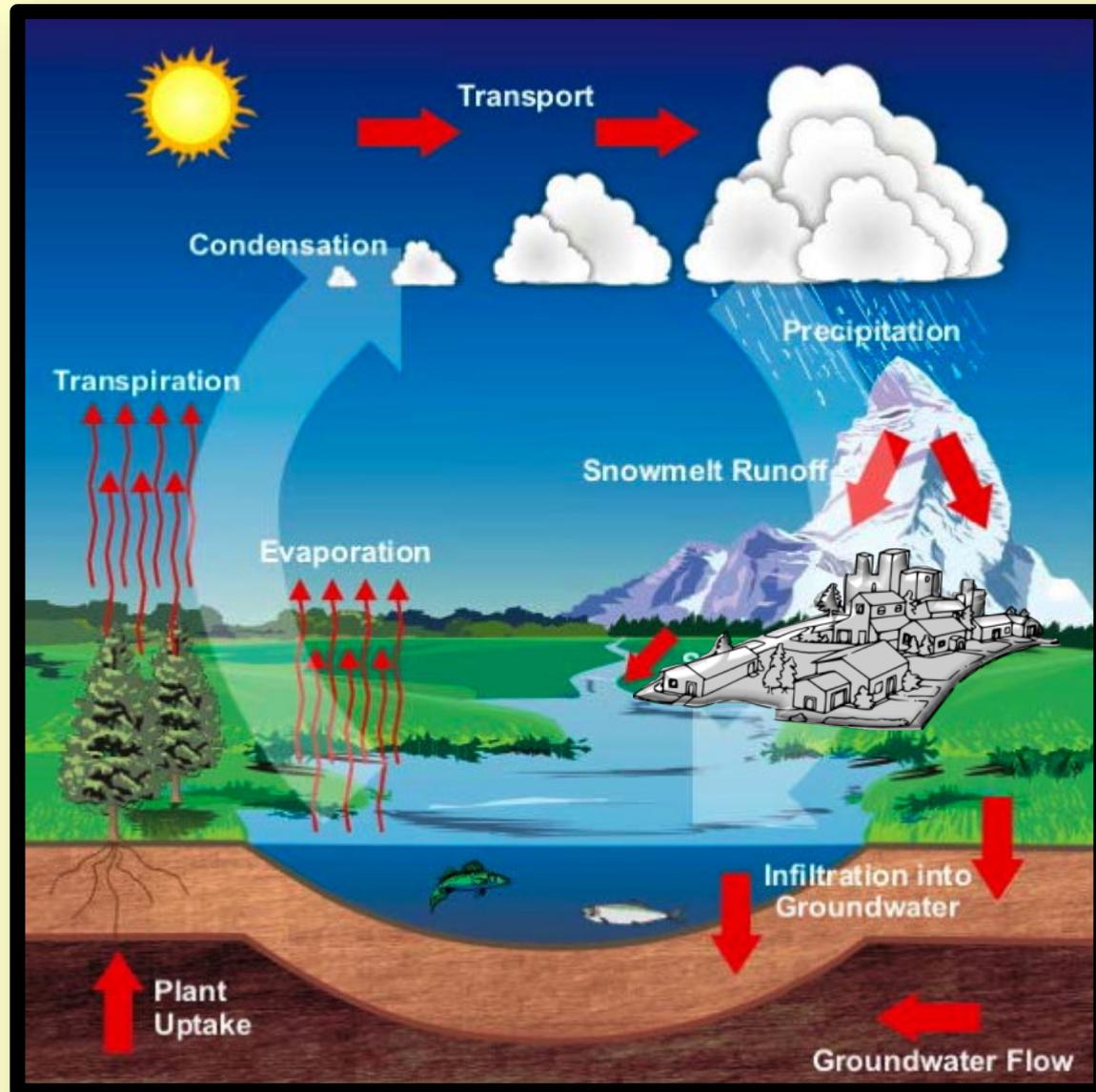
**Q & A**

**Intro to Waukegan Boathouse rg**

**Field Trip**

**Back in time for closing remarks**

# Infiltration Interrupted





## stormwater runoff

Water from rain or melting snow that doesn't soak into the ground.

# Runoff Carries Pollution

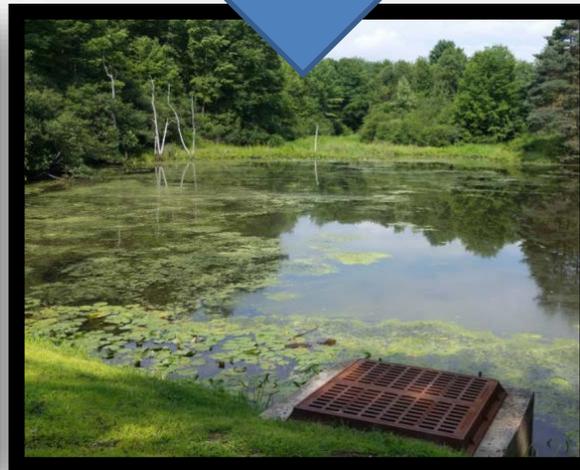


# Pollutant Examples

Sediment

Nutrients

Bacteria



**ADVISORY**  
High levels of BACTERIA have been detected in this WATER.  
N.H. Dept. of Environmental Services

**WATER CURRENTLY NOT SUITABLE FOR WADING OR SWIMMING!**

Exposure to this water may cause nausea, vomiting, diarrhea, or fever.  
Children, the elderly and others with sensitive immune systems are especially vulnerable.

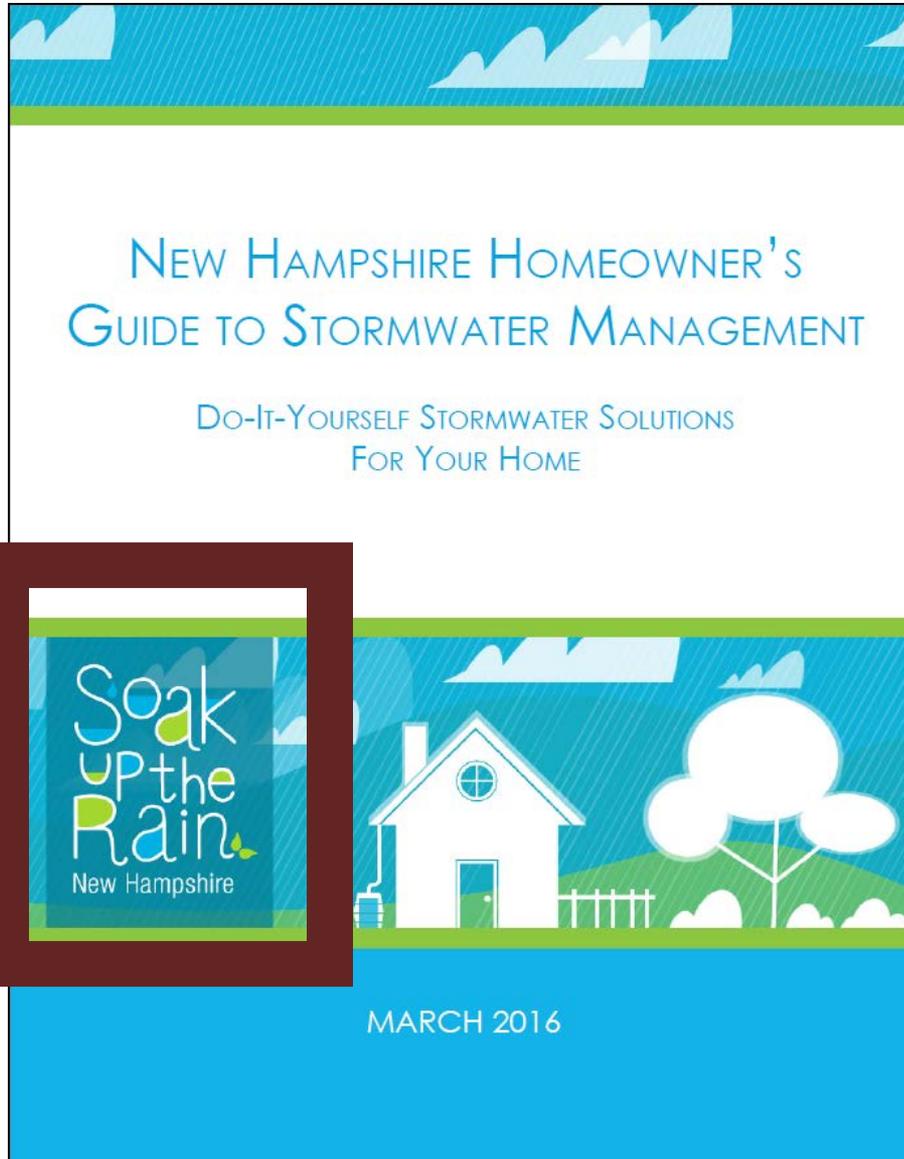
All current advisories posted at [www.des.nh.gov](http://www.des.nh.gov)  
Click "beach advisory" in left column.

**CONTACT INFORMATION:**  
NHDES Beach Program  
79 River St., Concord, NH  
(603) 271-6668  
[beachnh@des.nh.gov](mailto:beachnh@des.nh.gov)

# Residential Runoff



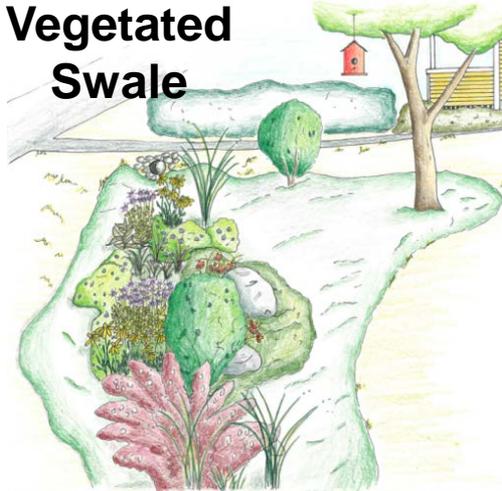
# Residential Stormwater Management



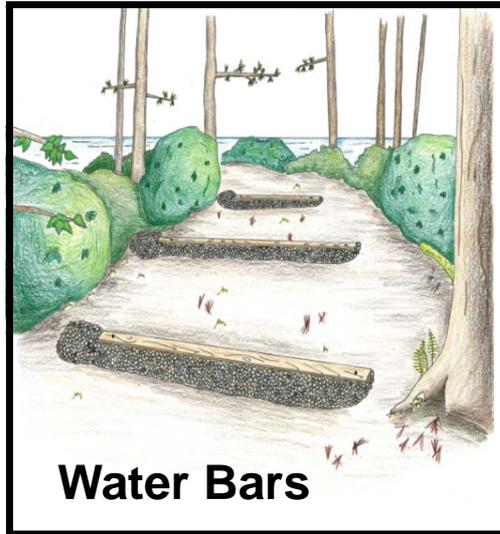
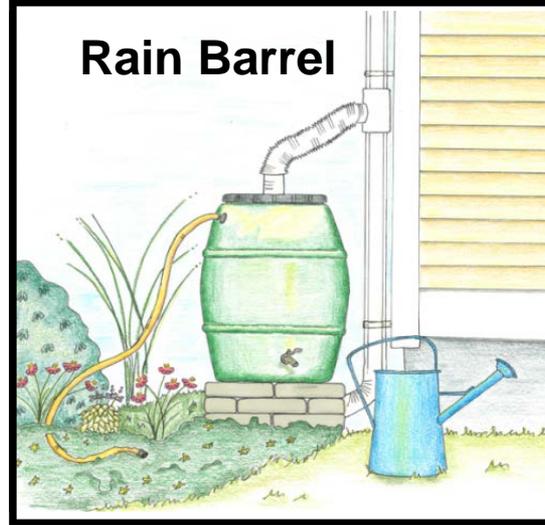
- Why
- How
  - Property assessment
  - 10 Stormwater Solutions
- Resources

# Capture / Slow / Direct

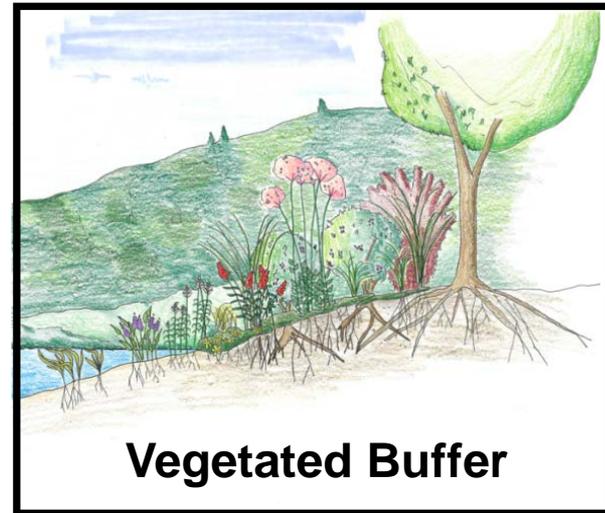
**Vegetated Swale**



**Rain Barrel**

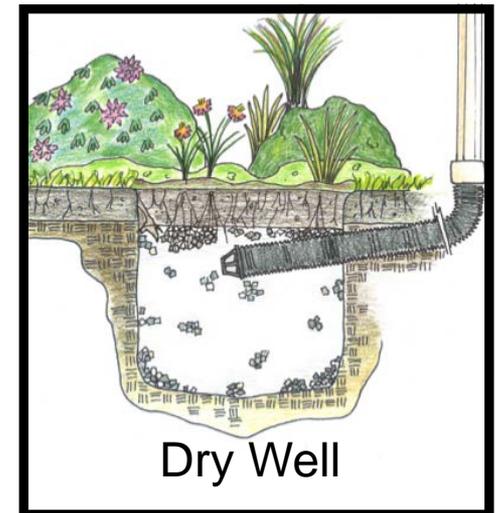
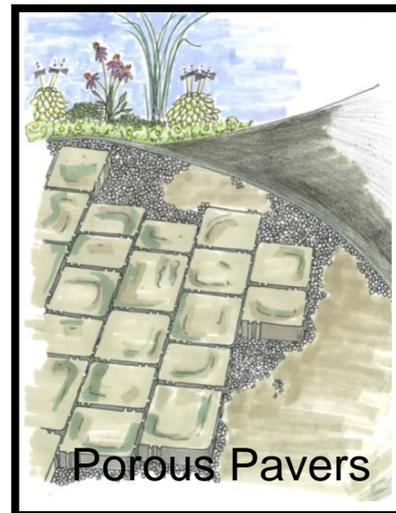
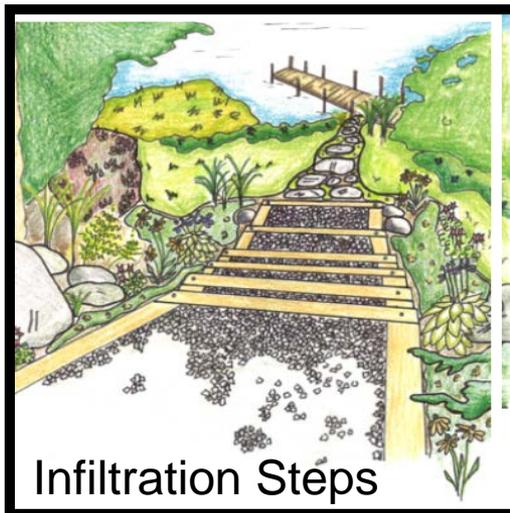
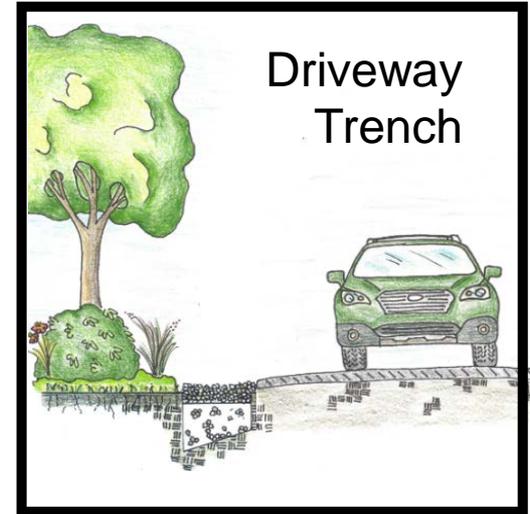


**Water Bars**



**Vegetated Buffer**

# Holes filled with stones or PLANTS!

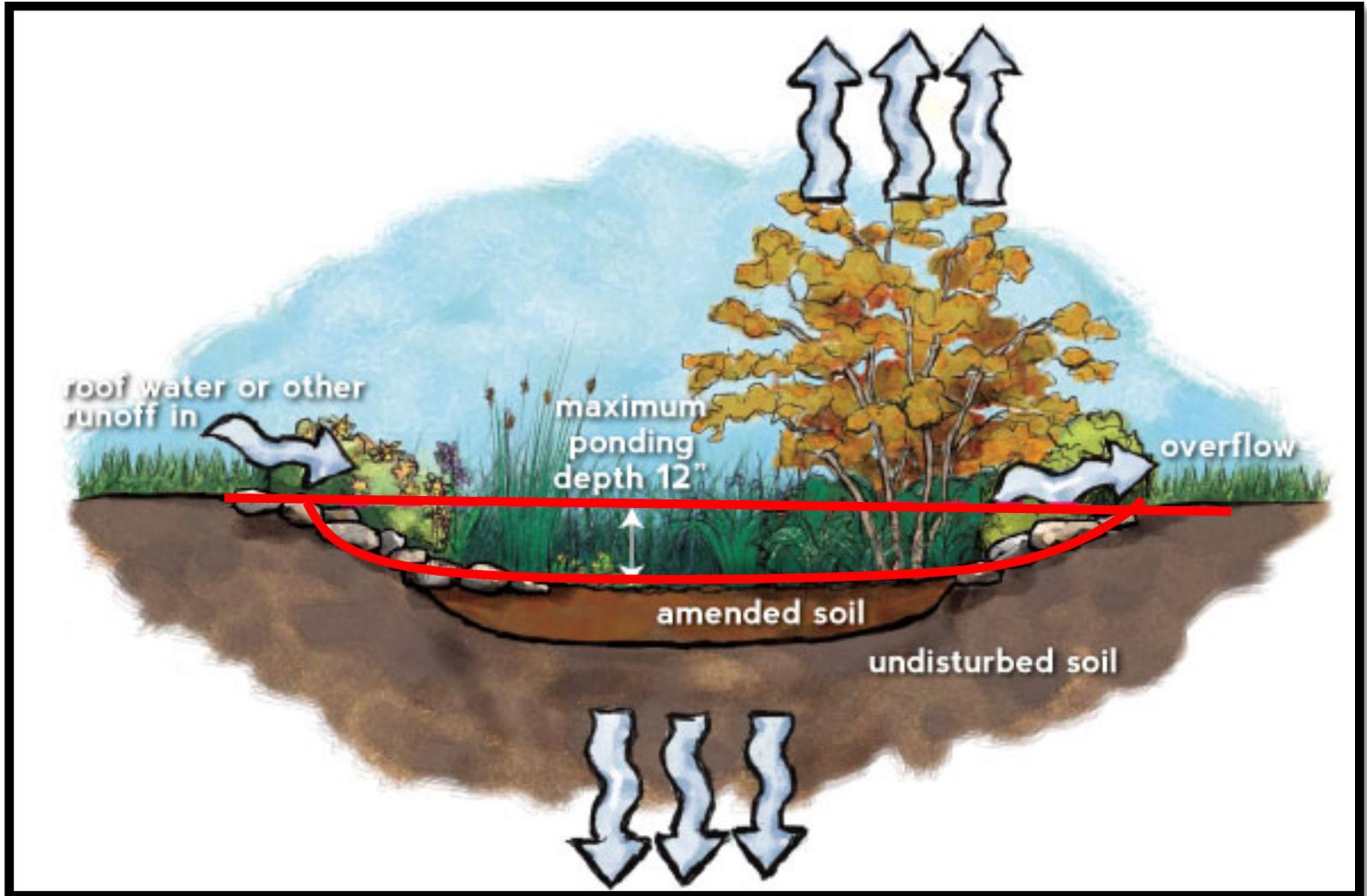


# What is a Rain Garden?



A sunken garden that uses plants and soils to capture, absorb and, treat stormwater.

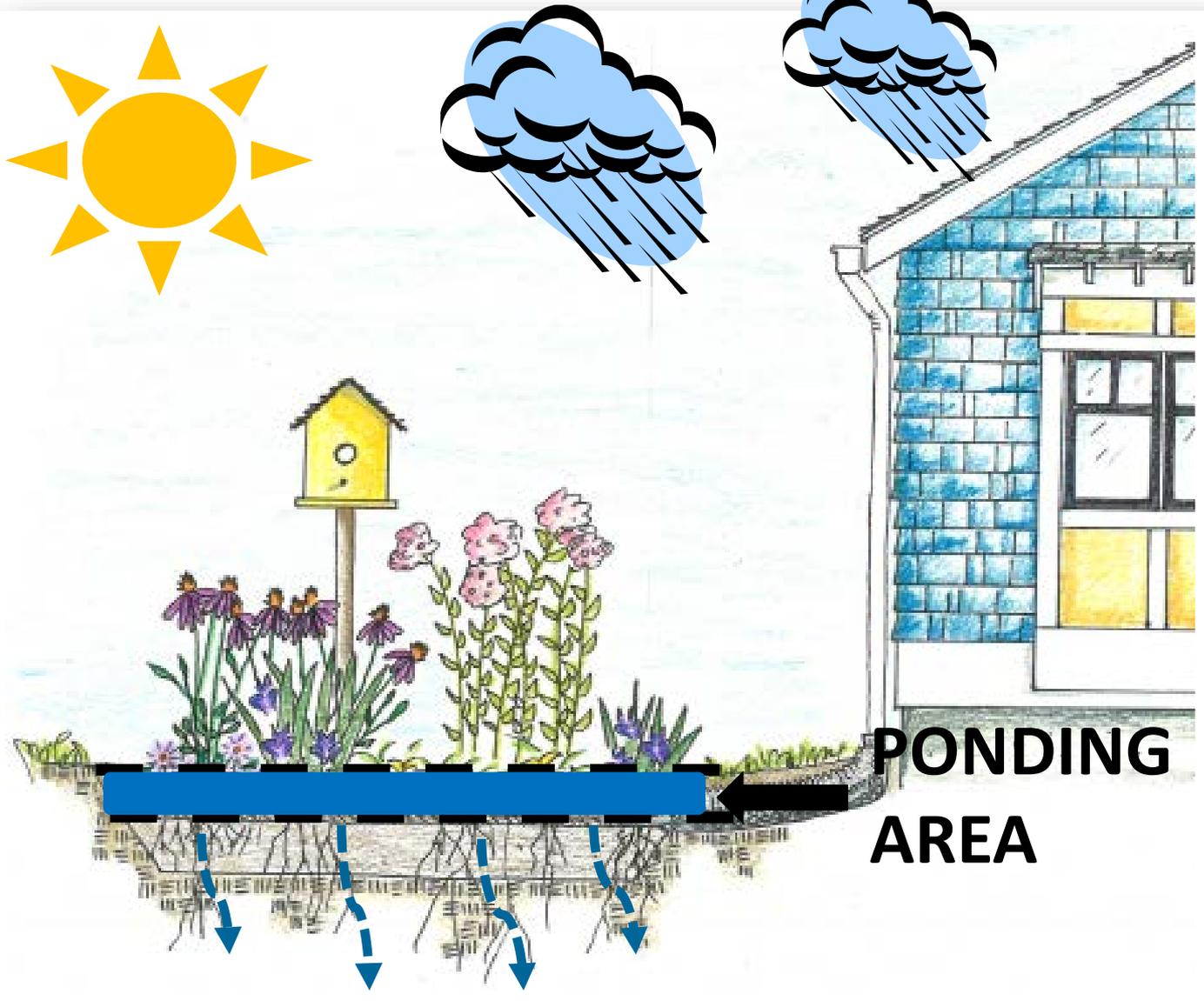
# Rain Garden Profile



# How Does a Rain Garden Work?



# Rain Garden - Key Feature

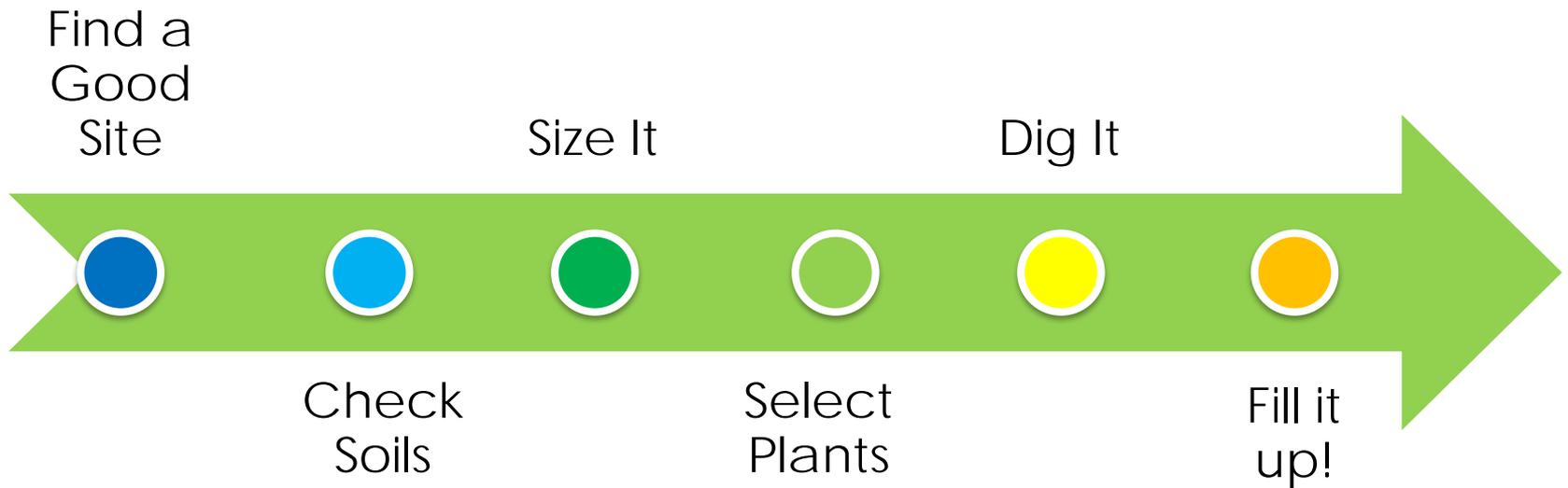


# Rain Garden Benefits

- Reduce runoff
- Replenish groundwater
- Filter pollutants to reduce pollution
- Provide habitat
- Beautiful!



# Steps to Build a Rain Garden



# Select a Good Site

- 
- A decorative graphic on the left side of the slide consists of a large green arrow pointing downwards, overlaid on a blue background with diagonal white lines. A small blue circle with a white border is positioned near the top of the green arrow.
- What runoff will you capture?
  - Avoid areas:
    - With standing water after it rains
    - Within 10 feet of your foundation
    - Near your water well
    - Near tree roots
    - Septic tank or leach field
    - Steep slopes (<12%)
  - Call DIGSAFE to check for underground utilities.

# No Standing Water



Directing water to wet spot will make it wetter.

# Check Soils – Perc Test

1. Dig a hole ~12" deep.



2. Fill it with water. Let drain. Fill again.



3. Note water level & time.



Ideally, area will drain within 24 hours.

# Check Soils – Ribbon Test



Soil Type	Ribbon Length (inches)
sand	soil does not form a ribbon at all
silt	a weak ribbon <1.5" is formed before breaking
clay	a ribbon >1.5" is formed

# Size It



- Soil type
- Slope of the ground
- Drainage Area

# Size It – Wiggle room!



70 ft<sup>2</sup>

# Select Plants

- Native (at least non-invasive)
- Tolerant of fluctuating wet and dry conditions
- Sun or shade
- Different bloom times
- Native Plant List for New England Rain Gardens



Scientific Name Common Name	Rain Garden Zone		Soil Moisture	Light Exposure	Bloom Period & Color				Mature Size		USA Hardiness Zone	Attractive to:	Plant Notes	
	Base	Slope			Beam	May	June	July	Aug	Sept				Oct
<b>Eutrochium</b> (formerly <i>Eupatorium</i> ) <b>purpureum</b> Sweet Joe Pye weed	•			☔ ☀		•	•	•		3-6'	3'	3-8'	🐦	Popular cultivars include "Gateway" (6' tall) and "Little Joe" (3' tall). Other <i>Eutrochium</i> species are also suitable.
<b>Geranium</b> <i>clausa</i> Closed geranium or Meadow bottle geranium	•			☔ ☀			•	•		1-3'	1-2'	3-8'	🐦	True blue flowers never fully open. Good understory plants.
<b>Geranium</b> <i>maculatum</i> Spotted crane's bill	•			☔ ☀ ☁			•	•	•	1'	1-1.5'	4-8'	🐦	Geraniums come in many species and cultivars. "Spessart" is a popular cultivar with pink early summer bloom. "Kozanne" is a blue, late summer bloom.
<b>Helenium</b> <i>autumnale</i> Common sneezeweed	•			☔ ☀			•	•		2-5'	3'	3-8'	🐦	Orange and red-colored cultivars available.
<b>Iris</b> <i>versicolor</i> Blue iris or blue flag	•			☔ ☀	•					2-3'	2-3'	2-7'	🐦	Sturdy plant with thick rhizomes. Great choice for placing near the rain garden inlet and outlet.
<b>Labella</b> <i>cardinalis</i> Cardinal flower	•			☔ ☀ ☁			•	•	•	2-4'	2'	3-8'	🐦	Labella will often reseed itself and migrate in the garden.

# Dig It - Shape



# Dig It – Remove Sod



# Dig it – Level it



# Dig It – Build Berm

Uphill  
stake

Downhill



Up  
st



# Connect it



# Inlet and Outlet



# Fill it up



# Finished Product(s)



# Let it Rain!



# Maintain it

1. Inspect periodically and after heavy rain.
2. Respond as needed – weed, mulch, refresh materials.



Water



Weed



Refresh  
Mulch



Replace  
Plants

# Rain Garden (and beyond!) Resources

## INFILTRATION

Infiltration strips are designed to capture and infiltrate stormwater runoff from moderate slope areas, such as driveways, walkways, and paths. They are often used for shorefront erosion control.

## WATER BAR

A water bar intercepts stormwater traveling down roof downspouts, steep walkways, driveways, and other paved areas and diverts it into vegetated areas to reduce erosion.

## RAIN GARDEN

A rain garden is a sunken, flat-bottomed garden that uses soil and plants to capture, absorb, and treat stormwater. This helps to reduce stormwater runoff and recharge groundwater.



## SIZING AND DESIGN

**STEP 1. Measure the overall rise and run of the area in inches (Figure 1).**

**STEP 2. Determine the number of steps needed.** Divide the overall rise by the depth of the step (6" or 8") to determine the number of steps needed.

$\text{RISE} \div \text{TIMBER HEIGHT} = \text{NUMBER OF STEPS}$

**STEP 3. Determine the slope by the run.** Divide the overall run by the depth of the step (15" to be comfortable).

$\text{RUN} \div \text{NUMBER OF STEPS} = \text{SLOPE}$

**STEP 4. Determine the width.** The width is usually 4 feet, but can be adjusted based on site conditions.

## SIZING AND DESIGN

**STEP 1. Determine slope.** Measure the overall rise and run of the area to determine slope.

- Place one stake at the end of the slope and another at the downhill end.
- Tie a string to the stake at ground level. Use a level to level the string.
- Measure the length of the string. This is the run or length.
- On the downhill side, measure the distance from the string to the ground to the string.
- Divide the rise by the run by 100. This is the slope.

$\text{SLOPE} = \frac{\text{RISE}}{\text{RUN}} \times 100$

**STEP 2. Determine how many steps.**

- Compare your project slope to the spacing in Table 1. The number of steps should be the number of rows in the table that are greater than or equal to your project slope.

## DESIGN CONSIDERATIONS

**STEP 1. Site Constraints.** Identify site constraints in the area that the rain garden will be located such as:

- High water table - rain gardens should not be placed in persistently wet areas or areas where puddles regularly form.
- Underground obstructions such as gas or electrical lines, other utilities, structures or bedrock. Contact DigSafe 72 hours in advance of your project.
- Property boundaries and local setbacks.

**STEP 2. Setbacks.** Be sure to locate the rain garden:

- At least 10 feet away from buildings with basements to prevent seepage into the basement.
- At least 15 feet away from septic tank or leach field.
- Away from tree roots and drinking water wells.

**STEP 3. Infiltration test.** Perform a simple perc test to determine the ability of the soil to infiltrate water. Rain gardens should only be built in areas where a simple perc test drains completely within 24 hours. To complete a simple perc test:

### EQUIPMENT & MATERIALS

- ✓ Calculator
- ✓ Measuring tape
- ✓ Spray paint
- ✓ Yard stick
- ✓ 6-12 Stakes
- ✓ 2-4 long stakes (4')
- ✓ String
- ✓ Shovels
- ✓ Carpenter's level
- ✓ String level
- ✓ Rakes
- ✓ Compost/Woodchips
- ✓ Mulch
- ✓ Crushed stone
- ✓ Flat stones or pavers
- ✓ Tarp(s)
- ✓ Wheel Barrow(s)
- ✓ Plants

## SOAK Stories

### Soak Up the Rain Projects in NH

#### Completed SOAK Projects

Check out these projects on our [map](#).

#### 2018 Projects

[Infiltration Landing at Wentworth Lake in Wolfeboro](#) – Association

[Dave Denby's Infiltration Steps at Wentworth Lake](#)

[Infiltration Steps at Hothole Pond in Loudon](#)

#### 2017 Projects

[The Villages at Loudon Soak Up the Rain](#) – The Villages Association

[Balmoral Clubhouse Infiltration Steps](#) – Lake Winnipesaukee Association

[Waukegan Bathhouse Rain Garden](#) – Lake Winnipesaukee Association

[Lake Friendly, Less Convenient Retaining Wall Project](#) – Association

## Photo Galleries



Denby Infiltration Steps at Wentworth Lake 2018

8 images



Dry Well Greenland 2014

13 images



Infiltration Landing at Wentworth Lake 2018

7 images



Rain Garden and Driveway Trench PEA 2016

22 images



Rain Garden and Landscaper Training, Hampton 2015

27 images



Rain Garden Durham Residential 2016

21 images

## Install a Rain Garden

Learn the steps involved in installing a residential rain garden.

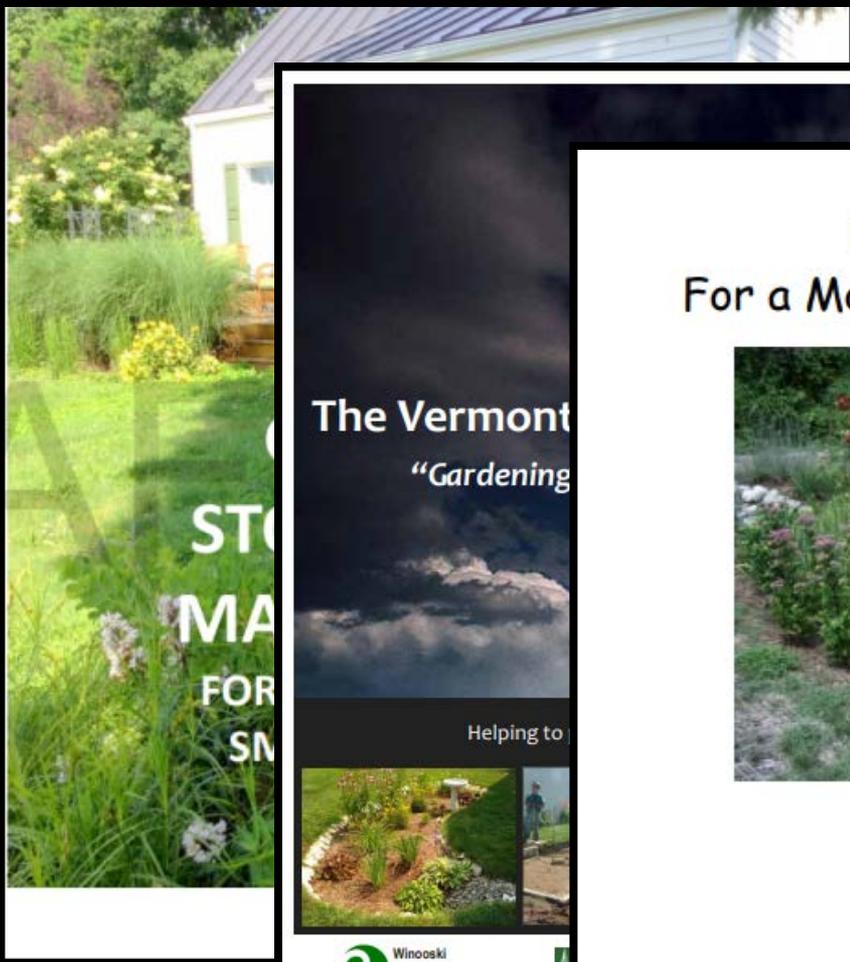


### PERENNIALS



ness zone	Attractive to:	Plant Notes
8	 	Popular cultivars include 'Gateway' (6' tall) and 'Little Joe' (3' tall). Other Eutrochium species are also suitable.
8		True blue flowers never fully open. Good understory plants.
8	 	Geraniums come in many species and cultivars. 'Spessart' is a popular cultivar with pink early summer bloom. 'Rozanne' is a blue, late summer bloom.
8	 	Orange and red-colored cultivars available.
7		Sturdy plant with thick rhizomes. Great choice for placing near the rain garden inlet and outlet.
8	 	Lobelia will often reseed itself and migrate in the garden.

# Resources



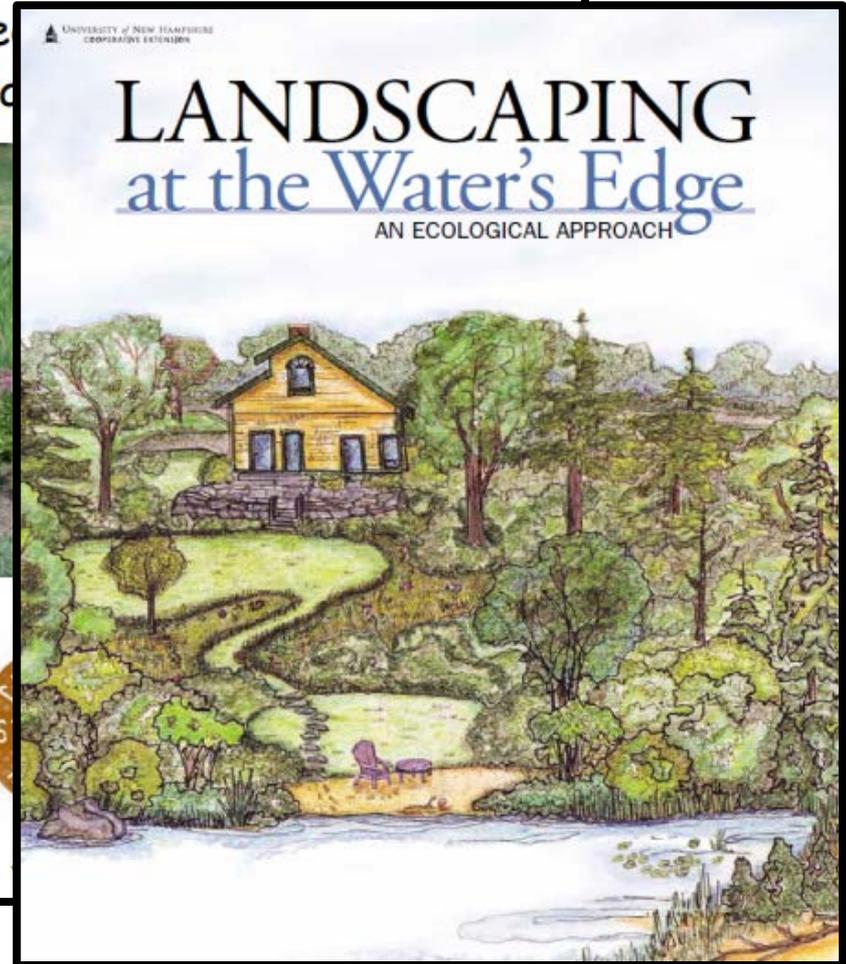
Home  
For a More B

The Vermont  
"Gardening

Helping to



Winooski  
Natural Resources  
Conservation District



# Questions?

[lisa.loosigian@des.nh.gov](mailto:lisa.loosigian@des.nh.gov)  
[www.soaknh.org](http://www.soaknh.org)





## Site 1-08A: Lake Waukegan Bathhouse Parking lot

**Problem:** Moderate surface erosion, bare soil in parking area, adjacent to catch basin that empties directly into the lake.





## Site 1-08A: Lake Waukegan Bathhouse Parking lot

**Solution:** Pave the parking lot, install bio-retention basin with rain garden. Install deep sump catch basin.

*Paved swale directs stormwater runoff to bio-retention basin.*



*Rain garden captures and infiltrates stormwater runoff.*