# STORMWATER MANAGEMENT TO IMPROVE WATER QUALITY AT WEIRS BEACH

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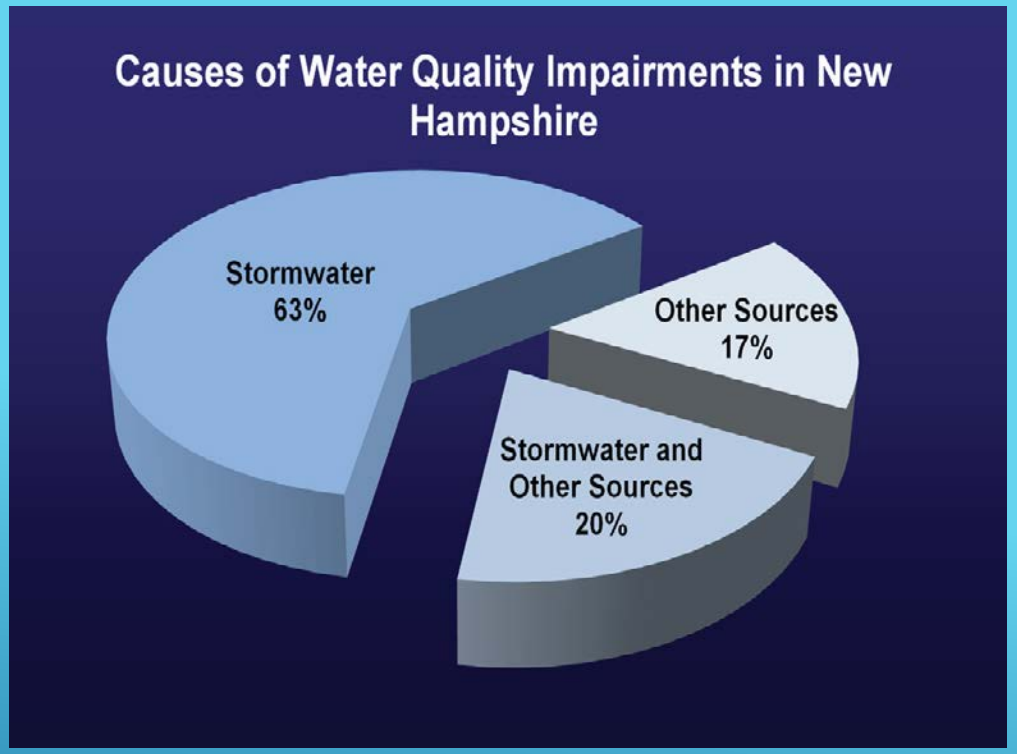
# AGENDA

1. Background why Stormwater is important ?
   a. Impact on lakes, value of clean water,
   b. Beach closures
2. Existing Water Quality Data
3. Homeowner Solutions
4. Proposed BMPs at Endicott Park
5. Technical Resources for Homeowners

Funding for this project was provided in part by a Watershed Assistance Grant from the NH Department of Environmental Services with Clean Water Act Section 319 funds from the U.S. Environmental Protection Agency.

# BACKGROUND: WHY IS STORMWATER IMPORTANT ?

- Stormwater is the leading cause of water quality impairments in New Hampshire
- *Source: NHDES's 2012 305(b) surface water quality report.*



# BACKGROUND: 2007 NH LAKES ASSOC. STUDY: ECONOMIC BENEFITS OF WATER RELATED RECREATION

- Combined Annual Sales of Anglers, Boaters and Swimmers > $379 million*.

- This Revenue is more than the Combined Revenue from Bike Week, two NASCAR events and Off-Road Vehicle Usage

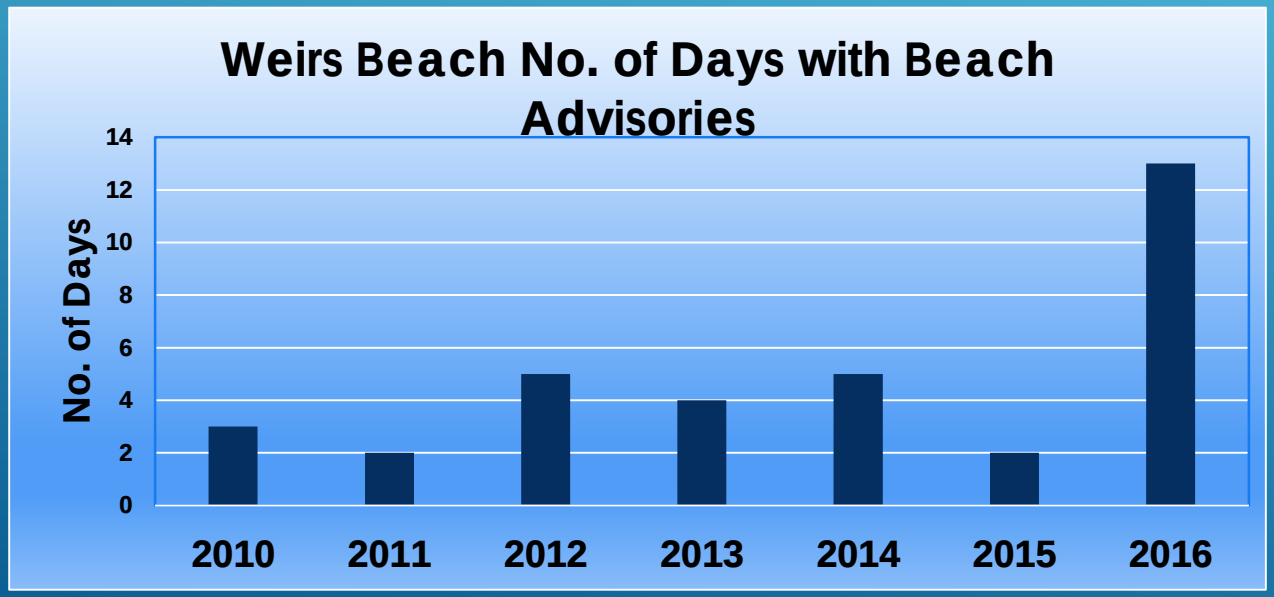
*Economic Impact of Potential Decline in New Hampshire Water Quality: The Link Between Visitor Perceptions, Usage and Spending; Phase IV Report. May 2007 Lakes, Rivers Streams and Ponds Partnership

# BACKGROUND: WATER QUALITY AND PROPERTY VALUES

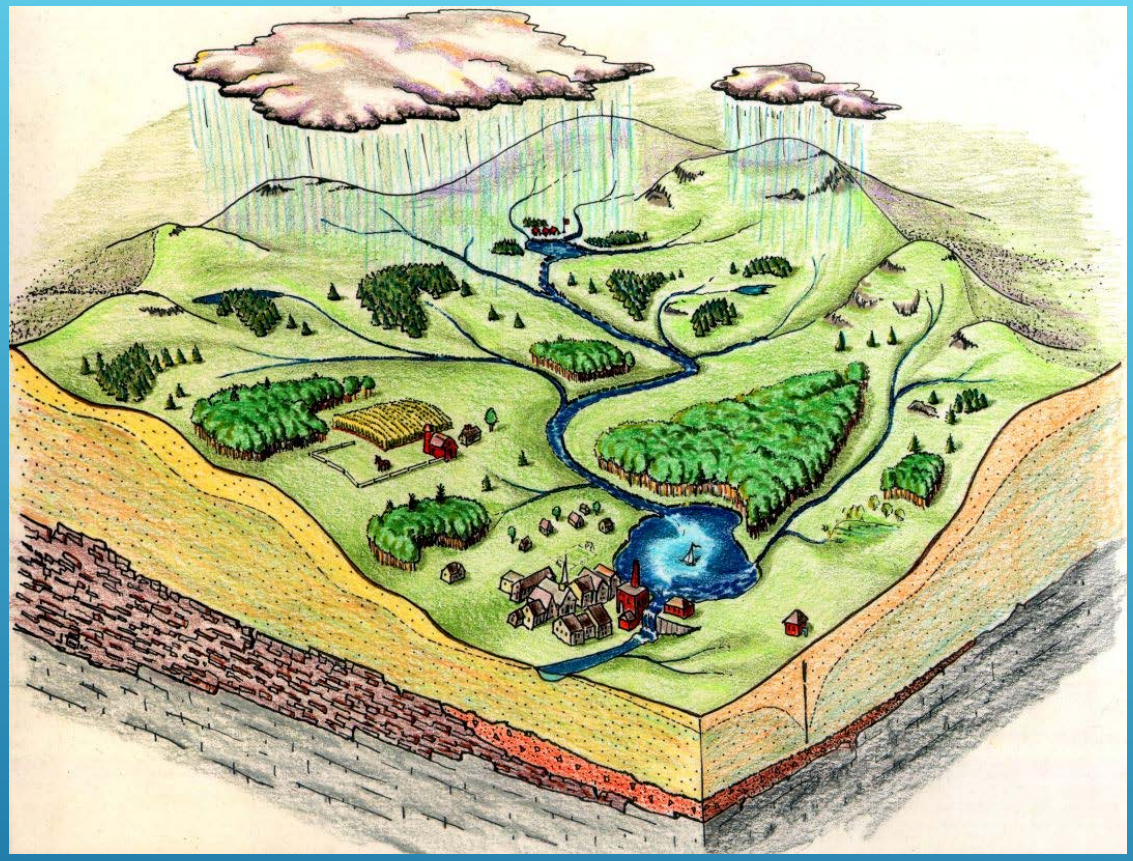
- **For every 3 feet decline in water clarity, shorefront property values can decline as much as 20%.**
- **Declining property values affect individual landowners, business and local economy.**
- **With property rights comes property responsibility**

# WEIRS BEACH: BACTERIA ADVISORIES

- NHDES has been collecting Bacteria Samples since 2003
- 71 % of the Samples are Clean
- Total No. of Advisories since 2003 = 18
- Ave No. of Days Posted = 3.5 days
- Current sampling shows high values from stormwater



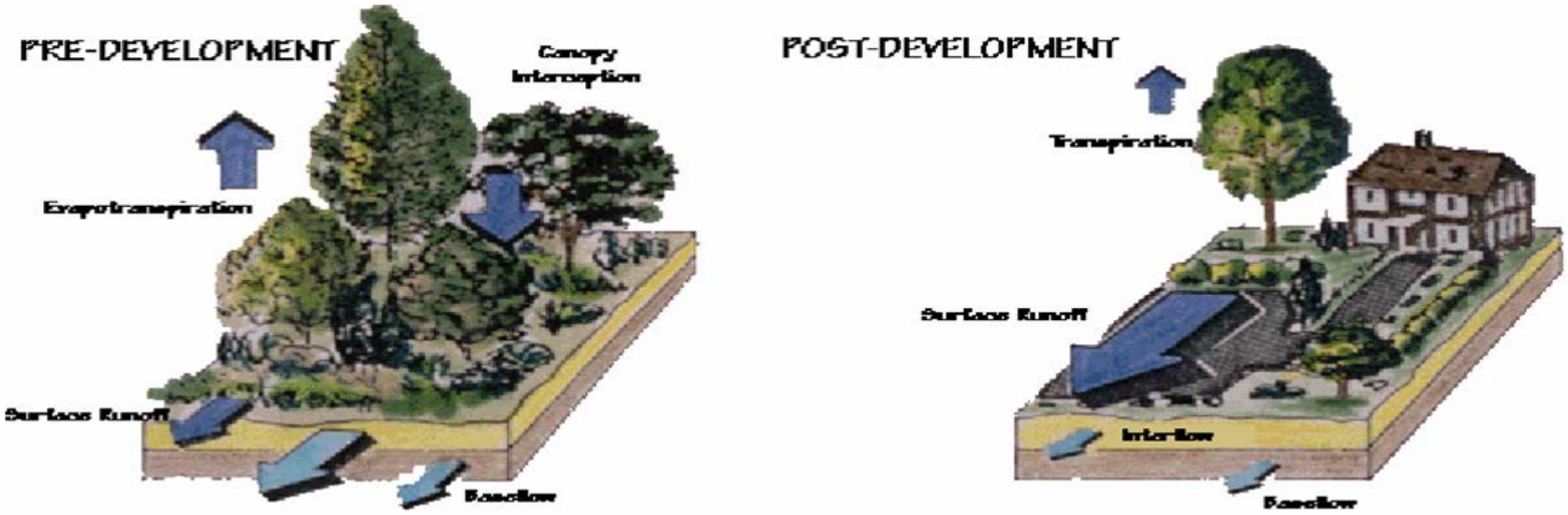
# STORMWATER: EFFECTS ON WATER QUALITY



# BACKGROUND: WATERSHED AREA

# BACKGROUND:
# THE EFFECT OF DEVELOPMENT

CHANGE IN RUNOFF
BEFORE AND AFTER DEVELOPMENT




This diagram shows how development and its corresponding increase in impervious cover disrupts the natural water balance. In the post-development setting, the amount of water running off the site is dramatically increased.

*Copyright 2000, Center for Watershed Protection*

# 1973 EXPERIMENT BY SCHINDLER

# 2007 EXPERIMENT BY KRETCHMER

Lake Wentworth Water

Lake Wentworth Water With Phosphorus Lawn Fertilizer

# TOO MUCH PHOSPHORUS GROWS ALGAE

# TOO MUCH ALGAE REDUCES WATER CLARITY, DEPLETES DISSOLVED OXYGEN AND POSSIBLE TOXIC ALGAL BLOOMS

Bear Island bloom

Broads bloom

# Total Phosphorus

(measured in parts per billion or ug/l)
(one ug/l is one teaspoon in an Olympic swimming pool)

- In-lake-Winnipesaukee is at 5-7 ug/l, we want to stay there.

- Weirs Beach- stormwater data from this summer shows phosphorus concentrations about 50 to 100 times higher than in-lake concentrations.

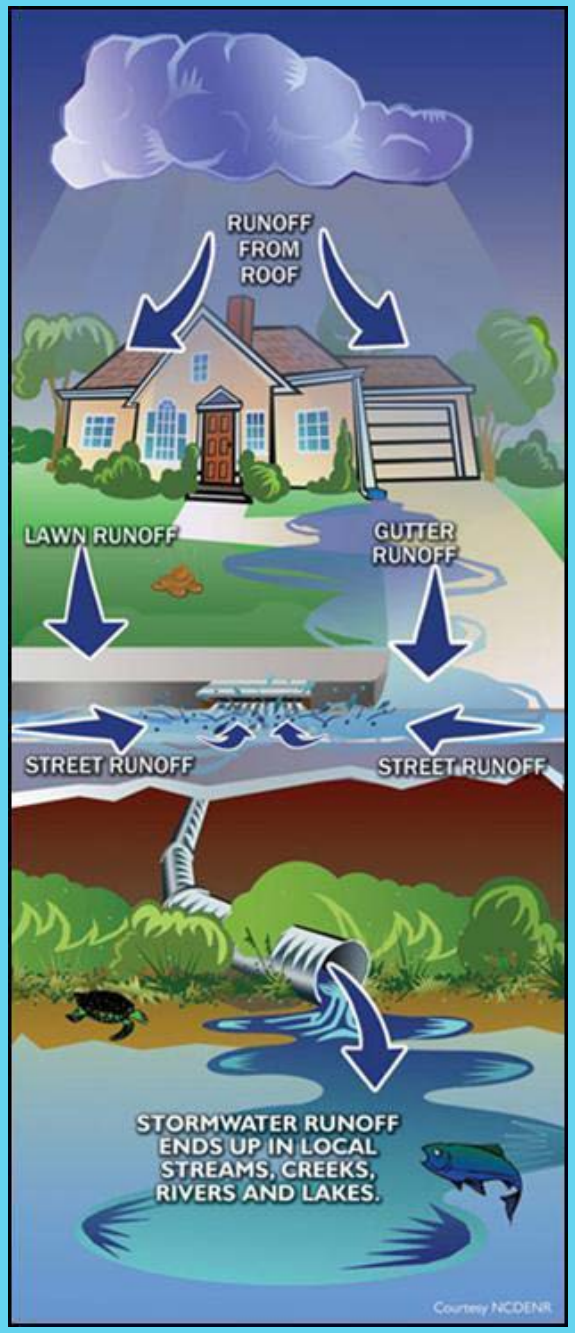
# SOLUTIONS; STORMWATER MANAGEMENT AROUND THE HOME

# STORMWATER RUNOFF AT THE PROPERTY LEVEL

- Anything We Apply or Use on Land can End Up in Stormwater
- Fertilizers, Pesticides, Driveway Sealers, Pet Wastes
- Septic Systems

Retaining Stormwater Onsite Reduces How Much Ends up in Lake

- How ?
  - Rain barrels, Rain Gardens, Dry Wells, Gravel Drip Lines



# SOLUTION: INFILTRATION

Direct runoff from boat ramp, Moultonborough

- Infiltrate, don't let stormwater run off directly to lake

Rain Garden, Back Bay, Wolfeboro

- Filtering water through natural vegetation and soil is the best watershed solution

# PHOSPHORUS FROM LAWNS

# IMPORTANT TIPS FOR LAWN MAINTENANCE

- Established Lawns Do Not Need Phosphorus:
  - leaving grass clippings is generally enough
- 2013 NH Fertilizer Law: RSA:431;  Retailers must sell:
  - Fertilizer with more than 0.67% available phosphate
  - No more 1 lb per 1,000 sf, unless otherwise labeled for new lawn establishment.
- Keep fertilizer and grass clippings on lawn –Not pavement.
- Minimize lawn area.
- Maintain at least a 25 foot buffer from drainage/ waterways
- Avoid any application when thunderstorms or rain in forecast.
- Best Time Apply: Early to mid-September;  After Oct 1st too late.

UNH Cooperative Extension: http://extension.unh.edu/resources/files/Resource004116_Rep5835.pdf

# SOLUTIONS: AVOID USING FERTILIZERS WITH PHOSPHORUS

Fertilizer phosphorus

**The most important nutrient in lakes**

**More Phosphorus means more algae growth**

**The middle number on a fertilizer bag (should be 0)**

# SOLUTIONS: DO NOT FEED WATERFOWL!

# SOLUTIONS: PROTECT SHORELINE VEGETATION.

**Land disturbance and development (erosion)**

# SOLUTIONS: MAINTAIN / INSPECT SEPTIC SYSTEMS TO MAKE SURE NO SURFACE BREAKOUTS

# SOLUTIONS: WHEN WE ARE AT THE BEACH

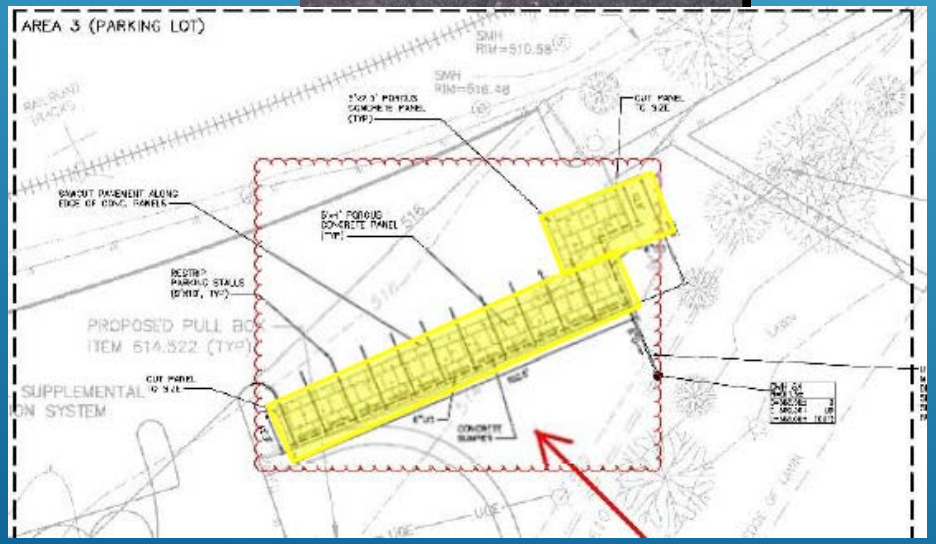
- Do not feed the ducks
  - Don’t leave food on the beach
- Dispose of all Trash in Containers
- Use Swim Diapers for Toddlers
- Instruct older children to use Rest Rooms
- Clean up and Dispose of all Pet Waste in Trash

# SOLUTIONS: PROPOSED CHANGES IN ENDICOTT PARK & LAKESIDE AVE

Public Docks
M/S Mt. Washington Pier
Endicott Park/Weirs Beach
Endicott Rock
Weirs Channel
Bathhouse
Lakeside Ave
Tower St
3

**Weirs Beach**

# SOLUTIONS: INFILTRATING RUNOFF IN ENDICOTT PARK PARKING LOT



# SOLUTIONS: MODIFY SWALE TO ENHANCE TREATMENT

## Proposed Changes

- Modify Swale Bottom to Non-mow Wetland Vegetation
- Add Stone Check Dams to Slow Water and Increase Infiltration

# SOLUTIONS: PREVENTING BEACH EROSION

- Modify Swale and Seal Joints in Wall to Prevent Seepage through Wall

# SOLUTIONS: MINIMIZE EROSION ALONG SERVICE ROAD

# SOLUTIONS: POSSIBLE FUTURE WORK IN WATERSHED

# ADDITIONAL RESOURCES AND INFORMATION

# NH "SOAK UP THE RAIN" PROGRAM: GEARED TO HOMEOWNERS

Resources

DIY Fact Sheets

Publications

Rain Garden Planning

Like us on Facebook

## DIY Fact Sheets

### Select a Stormwater Practice

If you need help choosing a stormwater practice, answer the question below and pick the appropriate chart.

Q: Does the soil at the proposed location allow water to soak in? (If you're not sure, so a simple perc test.)

Yes, use the Infiltration Flow Chart.

No, use the Storage Conveyance Flow Chart.

For step-by-step instructions, choose a practice below.

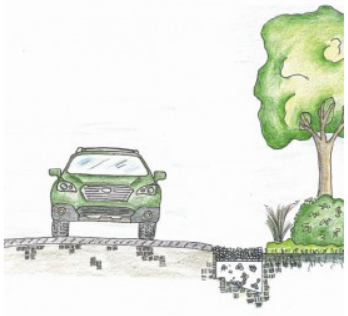
Do-it-yourselfers are encouraged to use the fact sheets listed below to complete their SOAK projects. Each fact sheet includes a list of recommended materials and equipment as well as step-by-step instructions for installation. Before getting started, check out the SOAK Project Steps page for tips on selecting a good location and appropriate stormwater practice for your property.

#### Dripline Infiltration Trench

A dripline infiltration trench collects and infiltrates stormwater from roofs until it soaks into the ground. It helps prevent stormwater from running off of your property.

#### Driveway Infiltration Trench

A driveway infiltration trench collects and infiltrat stormwater from your driveway allowing it to soak ground. It helps to reduce stormwater runoff.



# NH "SOAK UP THE RAIN" (CONT.):

## Pervious Walkways and Patios

Pervious pavers look like traditional pavers, but are able to absorb and store rain and snowmelt to reduce runoff from your property.

## Rain Barrel

A rain barrel captures rainwater from your roof to r
runoff from your property and provide you with wa
lawns, gardens, and indoor plants touse in dry wea

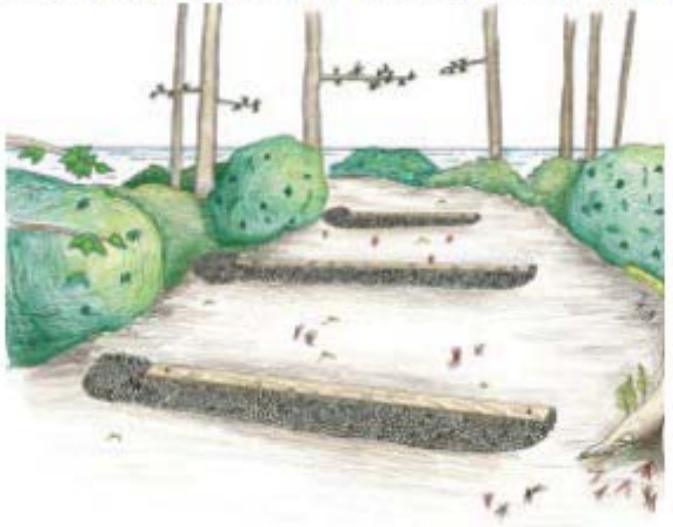
# NH "SOAK UP THE RAIN" (CONT.):

## Rain Garden

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

## Water Bar

A water bar intercepts runoff traveling down mode steep walkways, paths, gravel driveways, and othe and diverts it into stable vegetated areas to reduce



University of New Hampshire Cooperative Extension

# Landscaping for Water Quality

Soak Up the Rain LANDSCAPING FOR WATER QUALITY

**NEW!** A Directory of Landscape Professionals Trained in Ecological Landscaping for Water Quality Protection

## Soak Up the Rain - Landscaping for Water Quality

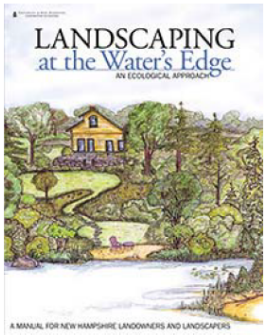
Your landscape can make an important difference in the health of Great Bay or your local rivers, lakes and streams, even if you don't live on shoreline property. Including trees, shrubs and herbaceous plants in your landscape will help capture and absorb rain water and snowmelt. This helps prevent contaminants such as nutrients, sediments and bacteria from reaching the Bay or other water bodies.

Do you or your landscaper know how to keep your property looking great without using excessive amounts of fertilizers and pesticides? Would you like to install landscape features that help promote clean and healthy water by slowing down, spreading out, and soaking up runoff on your property? These and other practices were covered in the short course, **SOAK UP THE RAIN – LANDSCAPING FOR WATER QUALITY i**n April and November, 2015. **Sample Agenda.**

Most of the program cost was underwritten by a Project of Special Merit Grant from the National Oceanic and Atmospheric Association (NOAA) awarded to the NH Dept. of Environmental Services and UNH Cooperation to develop and conduct this training. A list of landscape professionals who attended the training can be found here.

Contact Us | Links | Presentations | Publications

## Landscaping at the Water's Edge




Landscaping at the Water's Edge is an additional program available to train property owners about landscape practices for protection of water quality in lakes, rivers, streams and coastal areas. The program was developed by a team of UNH Cooperative Extension specialists in water resource and horticulture. If you would like to help sponsor a local training class, please contact cathy.neal@unh.edu or call 603-862-3208.

Landscaping at the Water's Edge Ecological Landscape Training UNH Cooperative Extension

Click on the Publications button below to order or download the book.

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# OTHER DIY RESOURCES FOR HOMEOWNERS

- Soak Up the Rain NH: www.soaknh.org
- Homeowner phosphorus calculator: http://winnipesaukeegateway.org/resources/phosphorus-calculator/
- NHDES Shoreland Homeowners Guide to Stormwater Mgt: http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/nhdes-wd-10-8.pdf
- UNH Cooperative Extension: Landscaping for Water Quality: http://extension.unh.edu/Sustainable-Landscapes-and-Turf/Landscaping-Waters-Edge
- UNH Fact Sheet on NH's Fertilizer Law: http://extension.unh.edu/resources/files/Resource004116_Rep5835.pdf
- NHDES Fact Sheet on Septic System Maintenance: http://des.nh.gov/organization/commissioner/pip/factsheets/ssb/documents/ssb-13.pdf
- Granite State Installers and Designers Web Site: http://www.gsdia.org/index.php?id=29

# Questions

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