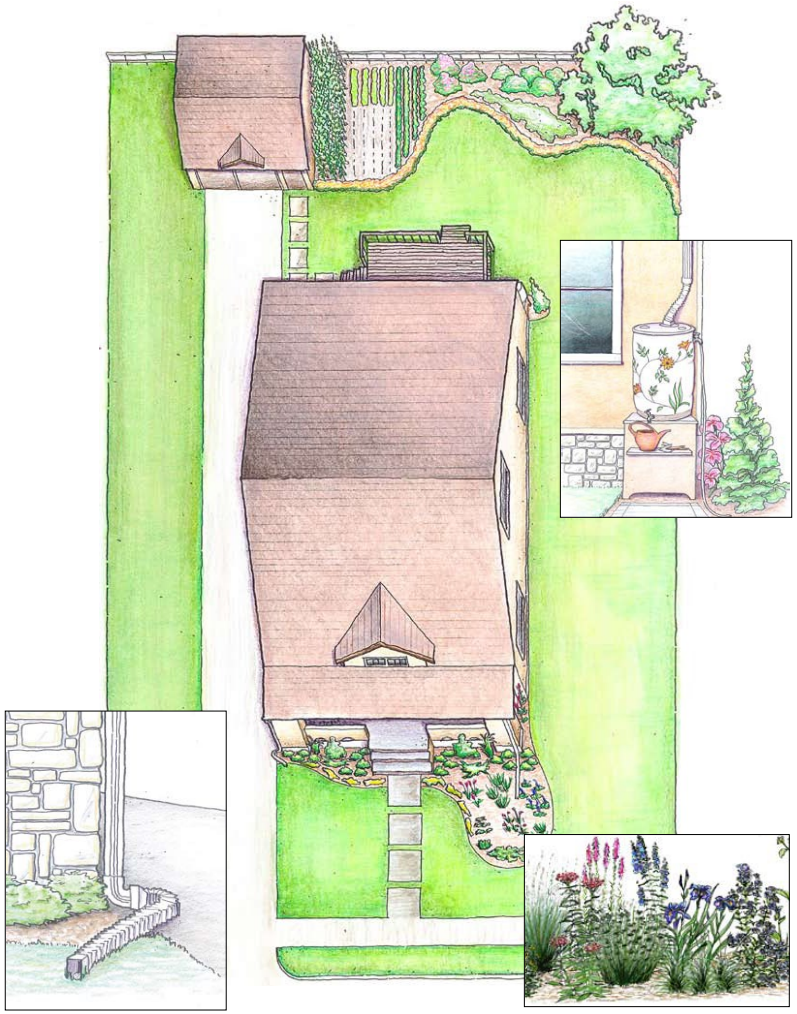
Absorb the Storm: Create a Rain-friendly Yard and Neighborhood



A Guide for Residents Interested in Protecting their Local Streams and Lake Champlain

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- Cover: Rain-friendly yard (Mid-America Regional Council)
  - http://www.marc.org/Environment/Water/pdfs/downspouts.pdf
- Page 4: Figure 1. Impervious surface diagram (Federal Interagency Stream Restoration Working Group)
  - http://www.nrcs.usda.gov/technical/stream_restoration/chap30002.html
- Page 5: Figure 2. Example of an urban watershed (Mid-America Regional Council)
  - http://www.marc.org/Environment/Water/homeowners.htm
- Page 9: Tree planting drawing (Clean Waters Factsheet 7)
  - http://nemo.uconn.edu/tools/publications/clean_waters/cwfact7.pdf
- Page 11: Downspout disconnect diagram (Mid-America Regional Council)
  - http://www.marc.org/Environment/Water/pdfs/downspouts.pdf
- Page 14: Healthy grass drawing (Center for Watershed Protection)
  - http://www.cwp.org/Resource_Library/Center_Docs/PWP/ELC_PWP130.pdf
- Page 16: Tree mulching drawing (Trees Are Good)
  - http://www.treesaregood.com/treecare/mulching.aspx
- Page 18: Rain barrel drawing (Environmental Services, City of Portland)
  - http://www.portlandonline.com/shared/cfm/image.cfm?id=182095
- Page 19: Rain garden drawing (University of Connecticut Cooperative Extension)
  - http://www.sustainability.uconn.edu/pdf/raingardenbroch.pdf

Pamphlet Purpose and Organization

This pamphlet provides resources for individuals and groups that are interested in implementing rain-friendly practices in residential areas, which will help protect our streams, rivers, and Lake Champlain. The pamphlet includes: 1) an explanation of how stormwater is responsible for water quality problems in urban and suburban streams, 2) a description of individual and group strategies for addressing stormwater runoff, and 3) detailed information about five recommended stormwater best management practices (BMPs).

Introduction

What is the problem with stormwater?
Stormwater is rain or snow melt that flows over the ground. Forested landscapes reduce the amount of precipitation that becomes stormwater due to evapotranspiration from plants and the absorption capacity of organic-rich soils. The result is replenishment of ground water supplies and a minimal amount of surface travel by stormwater to streams and lakes (Figure 1). The reduction of forests in developed areas has implications for how water flows through the landscape and the health of our rivers and lakes.

Over time, development has resulted in an increased amount of impervious surface area (rooftops, driveways, parking lots, roads). Areas that used to be able to infiltrate rainwater now contribute to the volume of stormwater runoff that is dumped directly into our streams, rivers, and lakes (Figure 1). Untreated stormwater is a problem not only because it collects pollution as it flows over impervious surfaces, but also because once within the stream the increased volume of water results in higher flows and faster rates of erosion (Figure 2). The soil that is eroded from the streambanks and streambeds decreases the clarity of the water, a problem for aquatic organisms and plants, and also adds additional contaminants that are attached to the soil particles. Phosphorus, one of the contaminants, can contribute to algae blooms in Lake Champlain.

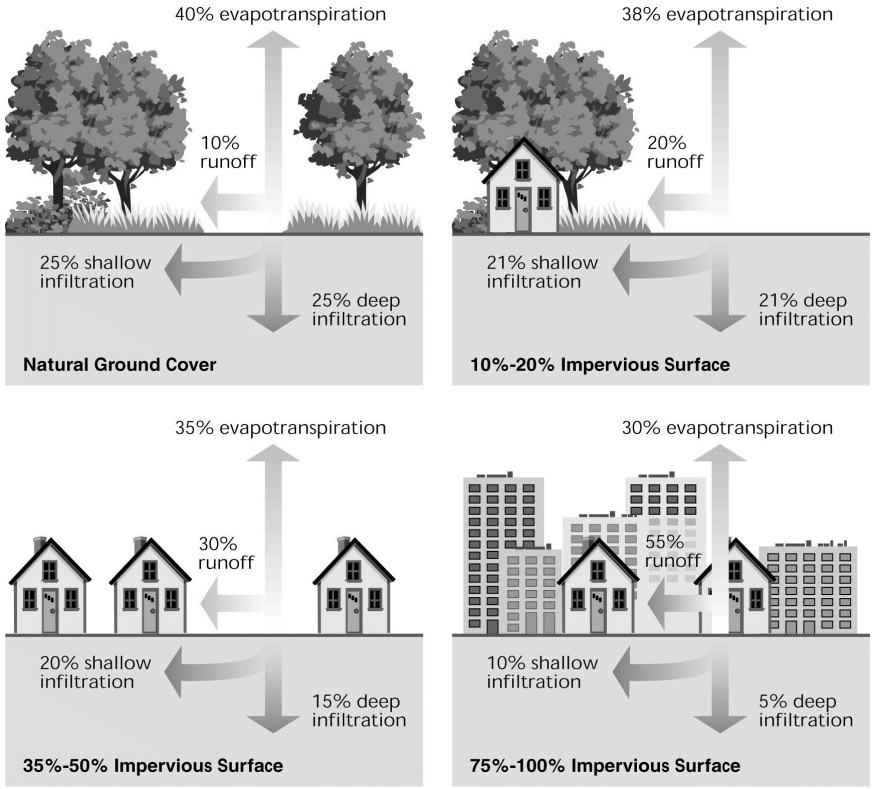


Figure 1. Diagram that demonstrates how increasing impervious surface area within a watershed impacts the water cycle and drastically increase the volume of stormwater runoff (Federal Interagency Stream Restoration Working Group).

Everyone lives in a watershed

Everyone lives in a watershed, the entire land area that drains to a particular water feature. Consequently everyone's actions have an impact on water quality. Our streams, rivers, and lakes can be protected by implementing practices that reduce the volume of stormwater runoff. Removing impervious surfaces is not always practical. In contrast, easily adapted landscaping practices help to reduce stormwater volume through infiltration or evapotranspiration.

Create a Rain-friendly Yard and Neighborhood

How do you reduce stormwater runoff?

Because stormwater runoff is a big water quality concern in urban and suburban areas, it is important to address it by focusing on

Resources

Friends of the Winooski River
http://www.winooskiriver.org/

Lake Champlain Basin Program (LCBP)
(802) 372-3213
http://www.lcbp.org/

Lewis Creek Association
http://www.lewiscreek.org

Smart Waterways
Chittenden County Regional Stormwater Education Program
(802) 846-4490 Ext. 29
http://www.smartwaterways.org/

South Burlington Stormwater Services
(802) 846-4106
http://www.sburlstormwater.com/

UVM Extension/Lake Champlain Sea Grant
(802) 656-0682
http://www.uvm.edu/~seagrant/

Vermont Agency of Natural Resources (ANR)
Department of Environmental Conservation (DEC)
Water Quality Division
(802) 241-3770 or (802) 241-3777
http://www.anr.state.vt.us/dec/dec.htm

Winooski Natural Resources Conservation District (WNRCD)
(802) 865-7895 Ext. 104
http://vacd.org/winooski/

If putting in a rain garden seems like a daunting task, build it gradually. Start with a small depression and a few plants and expand over time; or direct your downspout using extension to raised beds planted with flowers (see page 17 for roof concerns).

Instructions for Constructing a Rain Garden

If you are interested in constructing a rain garden check out the *Vermont Rain Garden Manual* on the Winooski Natural Resources Conservation District website. Download it for free or purchase a hardcopy by contacting:
Winooski Natural Resources Conservation District
(802) 865-7895 Ext. 104
http://vacd.org/winooski/

Community Groups can Help Beautify Their Neighborhood with Rain Gardens

- Organize a neighborhood plant swap in the spring or fall to distribute perennials for new rain gardens.
- Collect locations of new rain gardens to provide to WNRCD or UVM Extension to add to Vermont Low Impact Development (LID) Atlas (see page 21).
- Coordinate an effort to put in rain gardens at public buildings (e.g. senior center, school, town office, etc.) and contact ANR DEC, WNRCD, or UVM Extension (see page 21).

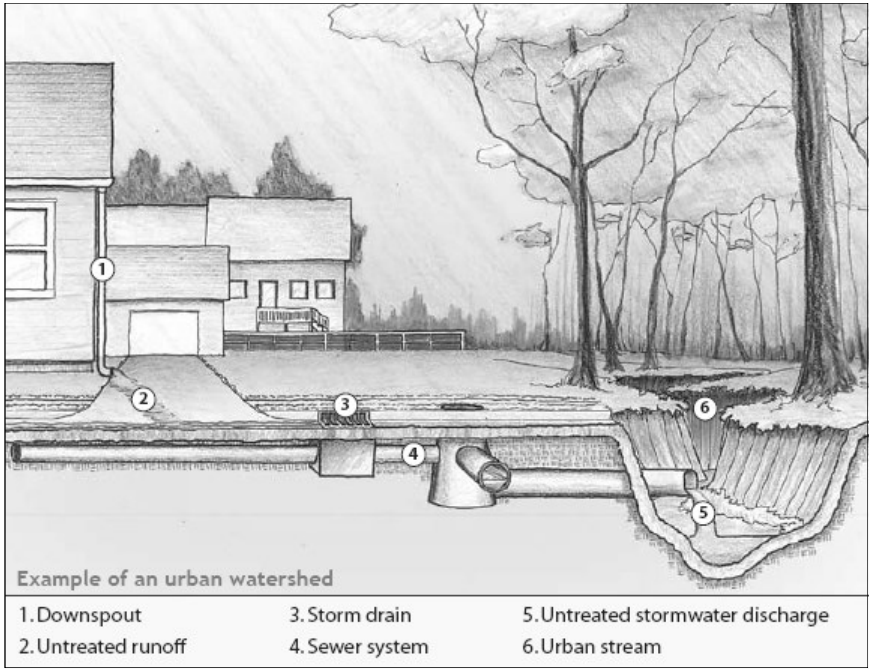


Figure 2. Diagram that shows an example of an urban watershed and the impact that stormwater volume has on urban streams (Mid-America Regional Council).

residential landscaping practices. To decrease the volume of stormwater runoff, rainwater that flows off impervious surfaces should be infiltrated as close to its source as possible. The basic concept is to keep the rain that falls on your property, on your property.

As a resident interested in protecting local streams, rivers, and Lake Champlain, you can make your own backyard rain-friendly. Then get your neighbors involved to help create a rain-friendly neighborhood. Although working on the individual level is important, engaging your whole community will ensure a greater impact. If you and your neighbors can get 15-20% of your neighborhood involved, you will have reached the critical mass needed for widespread social change to occur. Community acceptance will also help lead to implementation of similar practices on publically managed property.

What can I do as an individual?
If you are interested in implementing stormwater best management practices (BMPs) that capture and absorb rainwater on your own property see pages 8-20 where five practices are explained in detail. Residential practices for managing stormwater runoff include: 1) disconnecting and redirecting downspouts, 2) maintaining healthy lawns, 3) increasing the number of urban trees and shrubs, 4) installing rain barrels, and 5) constructing rain gardens. These individual actions are summarized in a table on page 12-13.

How can I get my neighbors involved?
Not only is it important to manage stormwater on your own property, it is also essential to engage the broader public to increase the role that your street, neighborhood, or town can have in protecting local waterways. Encouraging existing community groups to engage in neighborhood stormwater education and outreach projects is a first step. Finding partners within the community is also important, as well as using social marketing concepts to encourage the implementation of stormwater best management practices.

Identify a Community Group
The following organizations and groups in your community could be encouraged to take on a stormwater education and outreach project:

- Urban forestry groups
    - Examples: TREEage, Branch Out Burlington
- Garden clubs
- Youth groups
    - Examples: Scouts, 4-H club
- Parent teacher organization/association (PT0/PTA)
- City/town natural resources or conservation committees
- School environmental clubs
    - Example: South Burlington High School Green Team

Many organizations in Chittenden County are available to provide support to a community group. The organizations that may be able to provide technical assistance, ideas for projects and financial resources are listed on page 21. Their roles are more clearly defined within the description of each BMP.

- local hardware and garden supply stores
- Jack's Recycled Barrels
  http://www.jackscomposters.com/

- Conduct a "make your own rain barrel" workshop using directions that can be found online (page 15)or work with staff from the ANR DEC, WNRCD, or UVM Extension (page 21).

5: Capture and Absorb Water in a Rain Garden
A rain garden is a bowl-shaped garden designed to capture and absorb rainwater that runs off impervious surfaces, including roofs, parking lots, and driveways. If you have a small lawn and a large amount of water to absorb, rain gardens are a good option because they absorb 30% more water than the equivalent area of a typical lawn.

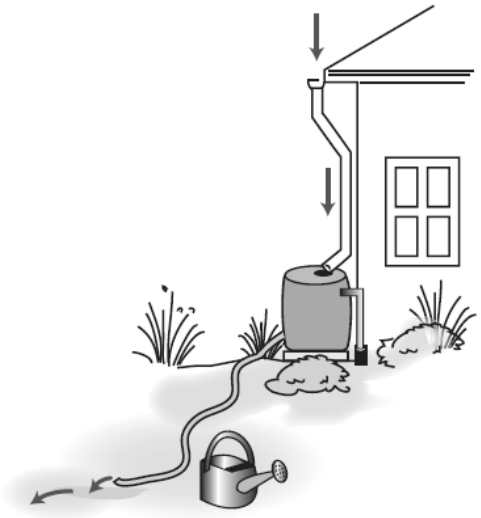
The garden is planted with hardy plants that are able to accommodate both very wet and very dry conditions. Rain gardens are designed to fill with a few inches of water that slowly filters into the

ground within the span of a couple days to prevent the development of mosquito larvae. Not only are rain gardens useful in reducing stormwater runoff, they can add to the aesthetics of your home and provide habitat for birds, butterflies, and insects.

- zinc (galvanized metal) anti-moss strips, usually mounted at the roof peak.
- asphalt or flat tar roofs, which may leach various complex hydrocarbon compounds

Studies have shown that metal and tile roofs generate little or no contamination and can be used to water all plants. Aluminum roofing, specifically, is recognized as the best material for rooftop rainwater collection systems because it holds up well and corrodes very little in comparison to other materials. Although aluminum roofing may add a trace amount of aluminum to the water, this does not pose a health risk.

If you are concerned about the quality of your roof runoff, water testing is provided by the Vermont Department of Health.
http://healthvermont.gov/enviro/ph_lab/water_test.aspx



Additional Information about Rain Barrels
Rain Barrel Guide (Southwest Florida Water Management District)
http://sarasota.extension.ufl.edu/Hort/Pubs/rain_barrels_guide.pdf

Community Projects to Promote Rain Barrels
- Work with rain barrel distributors to purchase a bulk order of rain barrels at the wholesale price.

Use Social Marketing Concepts
Once a community group has identified resources, the next step is to develop a successful process for engaging your neighbors in efforts to reduce stormwater volume. Using social marketing concepts to package and convey the message ensures that the results focus on actual behavior change as well as increased knowledge. Social marketing uses commercial marketing principles to sell positive ideas, attitudes, or behaviors. In addition, using a wide-range of media outlets helps reach a broader audience.

If funding is necessary, grants are available for community groups to fund water quality education and outreach efforts.

Information about Social Marketing
- Fostering Sustainable Behavior: Community-based Social Marketing
  http://www.cbsm.com

- Getting Your Feet Wet with Social Marketing: A Social Marketing Guide for Watershed Programs
  http://ag.utah.gov/divisions/conservation/documents/GettingYourFeetWet.pdf

Media Outlets
- Use social networking sites or online neighborhood forums
  - Front Porch Forum
  - Facebook group
- Submit articles to the local newspaper
- Participate in community events and have educational booth.
  - household hazardous waste days, harvest festivals, garden shows, block parties, sporting events, etc.

Examples of Funding Opportunities
- Lake Champlain Basin Program Grants
  http://www.lcbp.org/grants.htm
- DEC Watershed Grants
  http://www.anr.state.vt.us/dec/waterq/lakes/htm/lp_watershedgrants.htm

Best Management Practices for Capturing and Absorbing Your Property's Stormwater

1: Disconnect and Redirect Downspouts
If you have gutters and downspouts that drain roof runoff directly into the stormwater system or onto your driveway, then disconnecting and redirecting is an easy first step to creating a rain friendly yard. You can redirect your disconnected downspouts to the lawn, rain barrels, or rain gardens.

How to disconnect a downspout
1. Cut the existing downspout approximately 9 inches above the sewer standpipe with a hacksaw (see figure on page 11)
2. Cap the sewer standpipe.
3. Attach elbow by crimping the downspout with pliers to ensure a good fit. Connect elbow to downspout using sheet metal screws. It may be necessary to pre-drill holes.
4. Attach the elbow into the extension and secure with sheet metal screws. Water should drain at least five feet away from the house, so direct the extension accordingly. A splash block may help direct water further away from the house.
5. If desired, redirect downspout to rain barrel or rain garden (see page 15 and 19).

Additional Information about Downspouts
Lake Champlain Basin Program
http://www.lcbp.org/stormwater/index.html

Encouraging the Neighborhood to Redirect Downspouts
- With a community group, coordinate a neighborhood or street downspout redirection event that provides homeowners with technical assistance. The municipal public works department may be interested in providing assistance.

2: Increase Infiltration with a Healthy Lawn
Although a forest is the optimal upland cover for protecting water resources, a healthy lawn can help to absorb a significant amount of rainwater that would otherwise add to the stormwater problem.

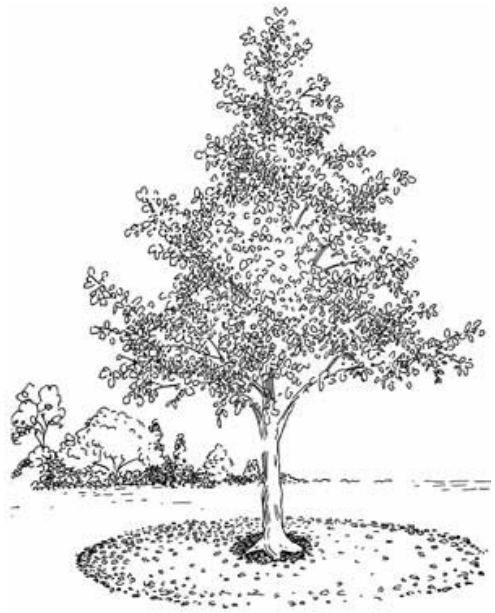
watering cans from the spigot.

Step 2: Modifying the downspout
1. Saw or cut your downspout at the appropriate height, 8-12 inches above the top of the barrel.
2. Attach downspout connector, secure junction with screw, and direct to the screened opening. The easiest and cheapest option is a flexible plastic or metal connector available at any hardware store. If your downspout is attached to the house, leave the bottom piece and at the end of the season you can reconnect the flexible downspout to the bottom piece and restore the original downspout drainage.
3. An overflow tube is usually provided with the barrel. Direct it away from your house and onto your lawn (the overflow discharge point should be at least 5 feet from your foundation).

Step 3: Optional modifications to your rain barrel
- Connect multiple rain barrels together in a series using the overflow tube.
- Connect a soaker hose to the spigot to water an area slowly.

Rain Barrel Maintenance
Once installed, rain barrels require little maintenance.
- Empty rain barrel monthly.
- Clean gutters regularly to reduce debris.
- Keep debris off the screen on top of rain barrel and all outlets.
- At the end of the season, drain rain barrel and store in a dry place upside down. Reattach your downspout connector to the downspout and direct water away from your foundation.

Concerns about Roofing Material
In general, the roof runoff is an excellent source of naturally soft, chlorine-free water that can be used to water your lawn and gardens. However, rainwater collected from your roof is not potable and runoff from the following roof types should not be used to water fruits and vegetables:
- wood shingles or shakes that have been treated with chemicals to make them resistant to rot and moss, lichen and algae growth
- copper roofs or copper gutters



Mulch wide—not deep.

- Paint options
    - Paints designed to adhere to plastic
        - Krylon Fusion and Rust-Oleum Paint for Plastic
    - Eco-friendly products
        - Krylon H2O Latex
        - AFM Safecoat brand of paint, primer, and topcoat
    - Any type of latex/acrylic paints or spray paints

Rain Barrel Installation

Installing rain barrels require that you have a roof that has gutters and downspouts. Where you decide to place the barrels will depend on the location of the downspouts and where you would like to use the water. There are two steps to installation: 1) setting up the barrel and 2) modifying the downspout.

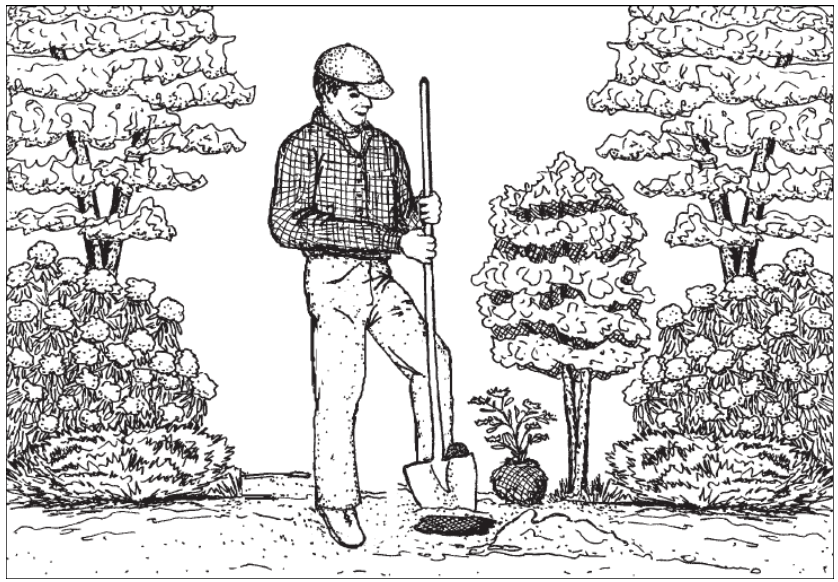
Step 1: Setting up a barrel

1. Make sure the ground is level where the barrel will be placed.
2. Place rain barrel on an elevated platform (concrete cinder blocks) to increase water pressure and make it easier to fill

A lawn that is managed to reduce stormwater and therefore protect water quality includes practices that improve the health of the soil as well as the grass. The end result is an ecosystem that easily infiltrates rain water and can fight pests and weeds without the help of fertilizers and pesticides. Unhealthy lawns need fertilizers and pesticides to look good, and have a diminished capacity to infiltrate rain.

Redefine what it means to have a healthy lawn by following these guidelines:

- Test your soil to fertilize correctly and determine if additional organic matter needs to be applied. Phosphorus is not needed in most places in Chittenden County.
- Choose a grass type that thrives in your climate and is adapted to conditions specific to your lawn.
- Mow your grass with sharp blades and keep your grass height around 3 inches.
- Leave grass clippings on your lawn to recycle nutrients and increase organic matter.
- If watering is needed, water in the morning.
- Use integrated pest management (IPM) techniques.
- Overseed lawn to out-compete weeds.
- Aerate when needed in May and June. If the soil needs additional organic matter, spread 1/4 in. of compost before aerating.



Additional Information about Lawn Care

Cornell Cooperative Extension
http://www.gardening.cornell.edu/lawn/

EPA, GreenScapes: Environmentally Beneficial Landscaping
http://www.epa.gov/waste/conserve/rrr/greenscapes/index.htm

Promote Lake-friendly Lawn Care Practices in the Community

Action for an individual

- Become a Master Gardener and provide healthy lawn care tips through volunteer projects.
  http://www.uvm.edu/mastergardener/

Actions for a community group

- Encourage hardware and garden supply stores to offer and promote the use of phosphorus free fertilizers.
  - "Don't P on Your Lawn" Campaign: http://lawntolake.org/
- Work with school district maintenance department to promote the use of lake-friendly lawn care practices.

3: Provide Healthy Urban Trees

In addition to providing shade and aesthetics, urban trees and shrubs can reduce the amount of runoff that finds its ways to streams, rivers, and lakes. Tree leaves, branches, and bark intercept and absorb rainwater and reduce erosion by slowing rainfall before it hits the soil. In addition, the root system increases infiltration and storage of rainwater.

Consider the Following When Planting Trees or Shrubs:

- Plan for spring or fall plantings. To ensure survival it is best to plant during the dormant season for trees and shrubs.
- Plant native trees and shrubs. Natives are recommended because they tend to be more resilient and will promote a healthy ecosystem. Large trees are best for water quality.
- Take into account the following potential hazards in determining the best location:
  - Proximity to sidewalk, road, buildings, utility lines etc.
  - Contact DIG SAFE (1-888-DIG-SAFE, 344-7233) to

or modify a zoning ordinance requiring an undisturbed vegetated buffer between waterways and new structures.

4: Collect and Conserve Water with Rain Barrels

A rain barrel or cistern is a container that collects water from your roof during a storm event and stores it for later use. Rain barrels are a fun and easy way to conserve water and help reduce the amount of stormwater runoff that flows off your property, which will help protect local rivers and eventually Lake Champlain. Using the naturally soft, chlorine-free water that collects in your rain barrels on lawns and gardens will improve the health of these plants.

Sources of Rain Barrels

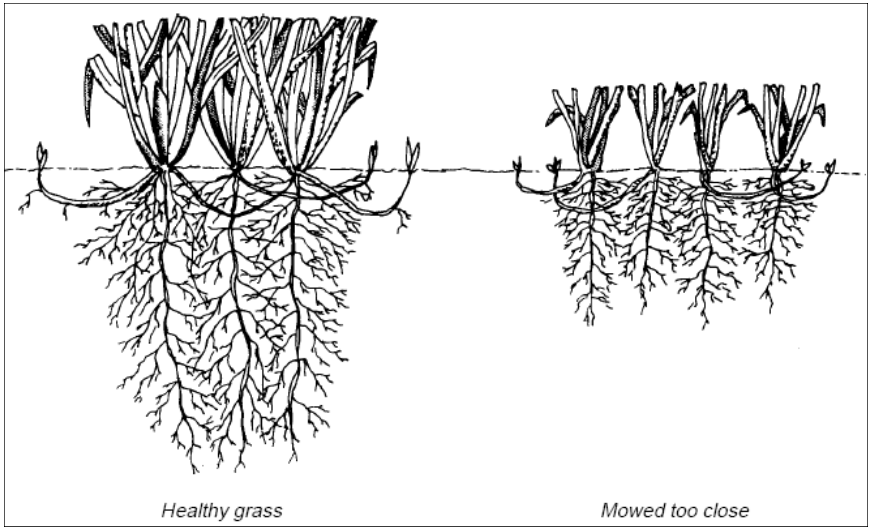
- Pre-made rain barrels cost $60 or more and can be purchased from hardware or garden supply stores.
- Do it yourself options can provide rain barrels at a much lower cost.
  - ANR DEC, WNRCD, and UVM Extension periodically host "make your own rain barrel" workshops.
  - Collect barrels from a local food/beverage distributor and make your own rain barrel from directions that can be found online.
    - Sources of reusable, 55 gallon, food grade barrels include International Foods (for sale) and local breweries.

Directions for Making a Rain Barrel

- Smart Waterways
  http://www.smartwaterways.org/resources/Make_Your_Own_Rain_Barrel.pdf
- Mid-America Regional Council
  http://www.marc.org/Environment/Water/pdfs/rainbarrels.pdf

Painting Rain Barrels

Not only can paint create an attractive barrel, it can also help protect the surface of the barrel from breaking down due to the harsh effects of the sun.

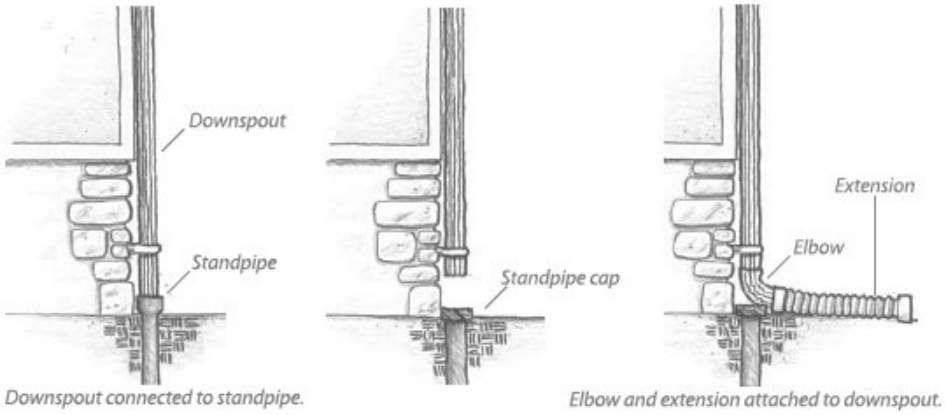


- Branch Out Burlington
  http://www.branchoutburlington.org/
- TREEage, South Burlington
  http://www.treeage.org/

- Participate in the Stewardship of the Urban Landscape (S.O.U.L.) program.
  http://www.vtfpr.org/urban/for_urbcomm_soul.cfm

Actions for a community group

- Inform neighbors about inexpensive sources of native trees and shrubs.
  - Winooski Natural Resources Conservation District's spring tree sale.
    http://vacd.org/winooski/
  - Intervale Center's Conservation Nursery
    http://www.intervale.org/programs/conservation_nursery/index.shtml
  - TREEage Community Nursery
    http://www.treeage.org/
- Petition the town to plant trees in the greenbelt in front of the houses on your street or block.
  - Contact city arborist or department of parks and recreation.
- Work with your town's planning commission to create



find out where underground facilities are located and to notify utility companies of any digging.

- Consider the following site characteristics when determining the specific tree or shrub to plant:
  - Available sunlight
  - Soils: type, drainage, compaction, fertility
    - Soil tests are available through UVM
      http://pss.uvm.edu/ag_testing/
- Don't plant too deep, make sure root collar is above the ground
- Only 2-4 inches of mulch is recommended in a ring around the tree extending to the drip edge.

Maintaining Trees and Shrubs:

- The amount of tree maintenance is dependent on the type of tree or shrub. Prune, fertilize, mulch, and water as needed.
- Clean fallen leaves out of the road, sidewalks and storm drains to reduce the leaching of nutrients in leaves into stormwater.

Additional Information about Urban Trees

- ANR DFPR community forestry library
  www.vtcommunityforestry.org

Help Increase the Number of Trees in Your Neighborhood

Actions for an individual

- Become a "tree keeper" and care for and maintain city greenbelt trees in front of your house.

Quick Reference: Strategies for Creating a Rain-friendly Yard and Neighborhood

	Actions for an Individual	Actions for a Community Group
1: Disconnect and redirect downspouts.	• Disconnect downspouts and redirect to lawn, rain barrel, or rain garden.	• Coordinate a neighborhood or street downspout redirection event that provides homeowners with technical assistance.
2: Increase infiltration with a healthy lawn.	• Test your soil. • Mow to keep grass height at about 3 inches. • Leave grass clippings on lawn. • Overseed • Use IPM techniques • Aerate and add compost when necessary • Become a Master Gardener and provide healthy lawn care tips to community through volunteer projects.	• Encourage hardware and garden supply stores to offer and promote the use of phosphorus free fertilizers. • Work with school district maintenance department to promote the use of lake-friendly lawn care practices.
3: Help provide healthy urban trees.	• Become a "tree keeper" and provide care and maintenance for city trees found in the greenbelt in front of your house. • Participate in the Stewardship of the Urban Landscape (S.O.U.L.) program • Purchase native trees and shrubs from local nurseries to enhance your property.	• Inform neighbors about inexpensive sources of native trees and shrubs from the WNRCD, TREEage, or Intervale nurseries. • Petition the town to plant trees in the greenbelt in front of the houses on your street or block. • Work with town planning commission to create or modify a zoning ordinance requiring an undisturbed vegetated buffer between waterways and new structures.
4: Collect and conserve water in rain barrels.	• Buy or build your own rain barrel from instructions found on the Smart Waterways website.	• Work with rain barrel distributor to purchase a bulk order of rain barrels at the wholesale price. • Conduct "make your own rain barrel" workshop using directions that can be found online or work with staff from the ANR DEC, WNRCD, or UVM Extension.
5: Capture and absorb water in a rain garden.	• Install a rain garden using Vermont Rain Garden Manual or contact ANR DEC, WNRCD, or UVM Extension for assistance. • Divert downspout to lawn and gradually build a rain garden as time and energy allows. • Direct downspout draining small roof area to raised bed.	• Organize a neighborhood plant swap to distribute perennials for new rain gardens. • Collect locations of new rain gardens to add to the Vermont LID Atlas. • Coordinate an effort to put in rain gardens at public buildings with help from ANR DEC, WNRCD, or UVM Extension.