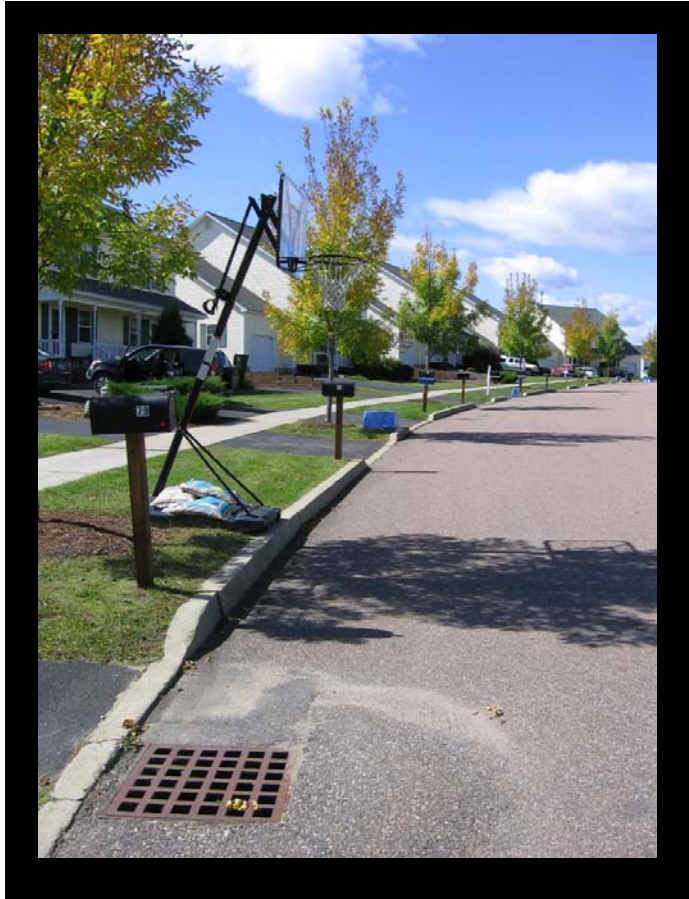




Small-Scale Stormwater Management in Vermont

Managing Stormwater from Rooftop to River



*Winooski Natural Resources
Conservation District*

Rooftop to River Initiative

This is your chance to make a difference!

**Stormwater + Roofs + Pavement
= Polluted Streams**
(Stormwater defined: run-off from rainfall and snowmelt)

Follow the **RED ARROWS** to see where water flows during a rainstorm or snowmelt event and what it picks up along the way. Where does all the water end up?

pollutants (oil, grease, paint, etc.)
pet waste (dog and cat droppings)
car related debris and heavy metals
debris from trees
insecticides and herbicides
auto fluids (oil, antifreeze, etc.)
antifreeze (DOT and non-DOT)

← **The Problem** **The Solution** →

Rain Garden
A rain garden is a perennial garden designed to capture stormwater run-off from a roof or driveway. Water is captured in a depression filled with water loving, native plants. Here the water has a chance to slowly filter into the ground rather than run off into the storm sewers.

Why use rain gardens?

- Allow stormwater to soak into the ground where it is naturally filtered and added to the groundwater supply.
- Rain garden plants are beautiful and add rich aesthetics to your property.
- Share a rain garden with a neighbor to capture stormwater from 2 roof tops.
- Create habitat for wildlife.

Rain Barrel
A rain barrel is a 50 - 75 gallon container placed below a gutter that collects and stores stormwater that you can use later to water your lawn or garden.

Why use rain barrels?

- Great for tight neighborhoods that don't have suitable space for a rain garden.
- Inexpensive, easy to make and install.
- Keeps polluted stormwater out of streams.
- Conserves the limited supply of drinking water that is needed in your home.

**Stormwater + Rain Gardens
+ Rain Barrels = Clean Streams**

Follow the **RED ARROWS** to see where water flows during a rainstorm or snowmelt event at a house where a rain barrel and a rain garden are installed. Where does all the water end up?

Follow the **RED ARROWS** to see where water flows during a rainstorm or snowmelt event at a house where a rain barrel and a rain garden are installed. Where does all the water end up?

Stormwater Education and Action Program

Rain Gardens □ Rain Barrels □ Pervious Pavement



Rain Gardens

South Burlington

“Cadillac Gardens”

SOIL: Clay

COST:

Labor: \$1,100

Materials: \$2,100

Site Design: \$5,000

FUNDING:

EPA

City of South Burlington





Rain Gardens

Landry Park, Winooski

SOIL: Construction fill

COST (3 gardens):

Labor: \$1,000

Materials: \$1,400

Site Design: \$0

FUNDING:

VT DEC 319

City of Winooski

CREES USDA New
England Water
Quality Project





Rain Gardens

Morrisville

SOIL: Construction fill

COST:

Labor: \$0

Materials: \$350

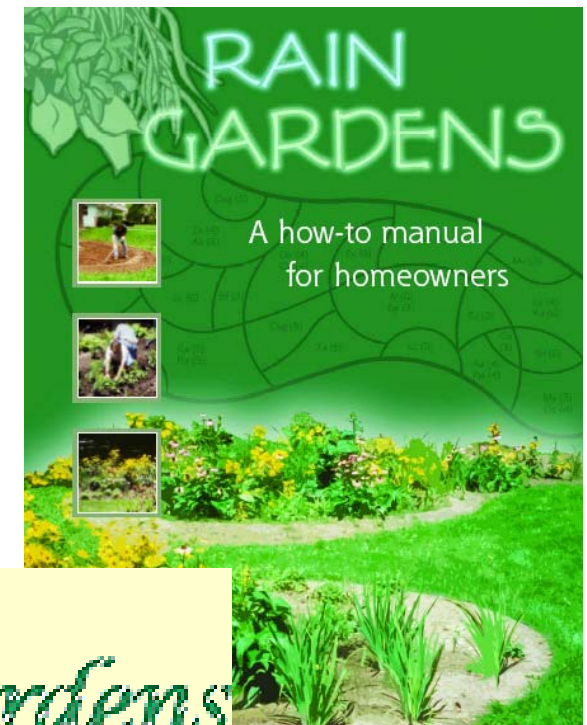
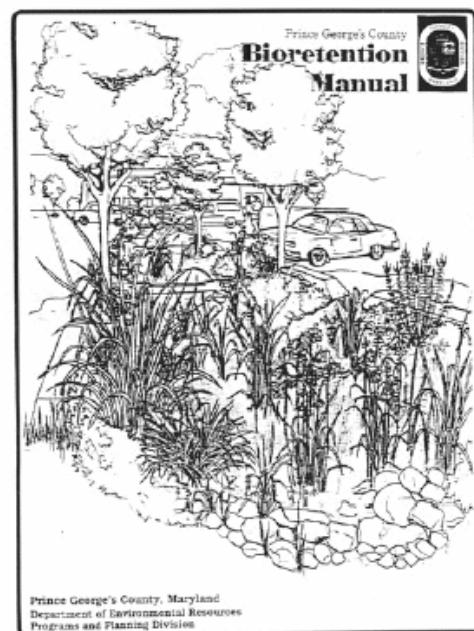
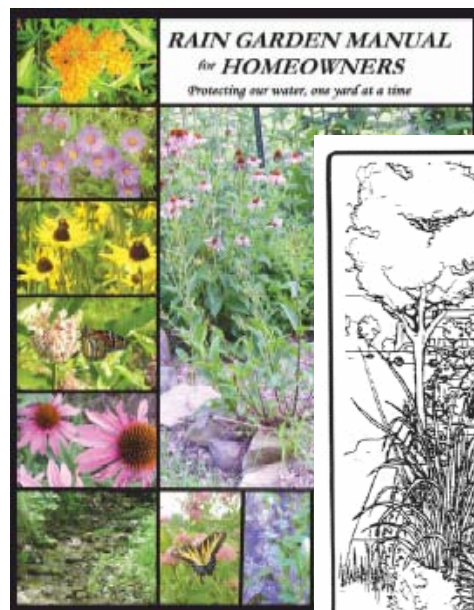
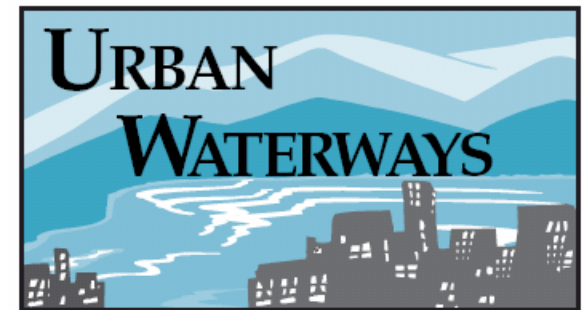
Site Design: \$0

FUNDING:

Lake Champlain
Basin Program



Vermont Rain Garden Manual



Vermont Rain Garden Manual



- Complete rain garden plant list for VT
- Six rain garden themes
- Map of existing rain garden demos in VT
- Contact info for VT rain garden suppliers
- Picture of universal rain garden sign

Rooftop to River Initiative

Stormwater Education and Action Program

This **RAIN GARDEN** is
protecting our local
watershed from
stormwater pollution.

www.vacd.org/winooski/



Pervious Concrete



Pervious \$190 / sq yard*

Traditional \$110/ sq yd

** price range depends
upon soil type*



Pervious Concrete

Taylor Park, St. Albans



*Photos courtesy Northwest Regional
Planning Commission*



Challenge:

- **Maintenance**
- **Confidence**

Pervious Concrete & Rain Gardens

*San Remo Dr,
South Burlington*



**Pervious
Concrete
Sidewalk**

Curb-Cut Rain Gardens



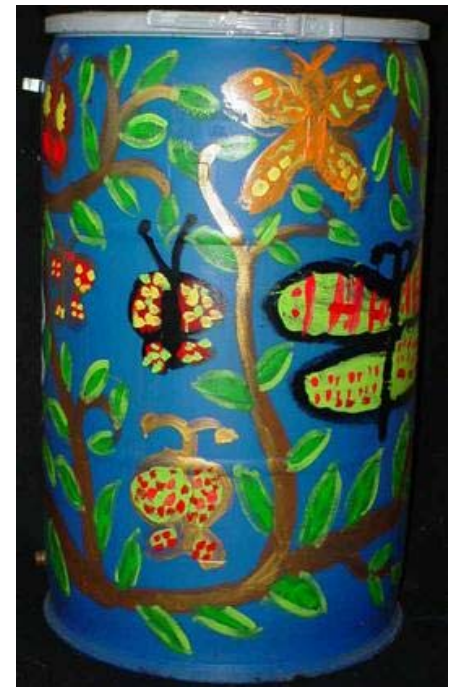
***Installed urban rain garden photos:
Green Streets Program, Portland, Oregon***

Portland Bureau of Environmental Services

Rain Barrels

Montpelier, South Burlington, St Albans

Managing stormwater by connecting high school art & science students with the community



Courtesy: Geauga Soil & Water Conservation District

LIDAR Elevation Mapping

RAN Program: University of Vermont



Education for Town Officials

LID Practices	Single Family Residential Lot	Small Commercial/ Multifamily Lot	Existing Development
Underdrain Soil Filters			
Bioretention System	○	●	⊙
Rain Garden	●	○	⊙
Swale	●	●	⊙
Vegetated Buffer	●	●	●
Infiltration Practices ¹			
Dry well	●	●	●
Infiltration Trench	⊙	●	●
Pervious Pavement	●	●	⊙
Rain Barrel/ Cistern	●	●	⊙
Green Roof	○	●	●
Stormwater Planter	○	●	●
Micro-bio Inlet	○	○	●

Key: ● = suitable, ⊙ = sometimes suitable with careful design, ○ = rarely suitable

Courtesy: Maine Coastal Program

Education for Town Officials

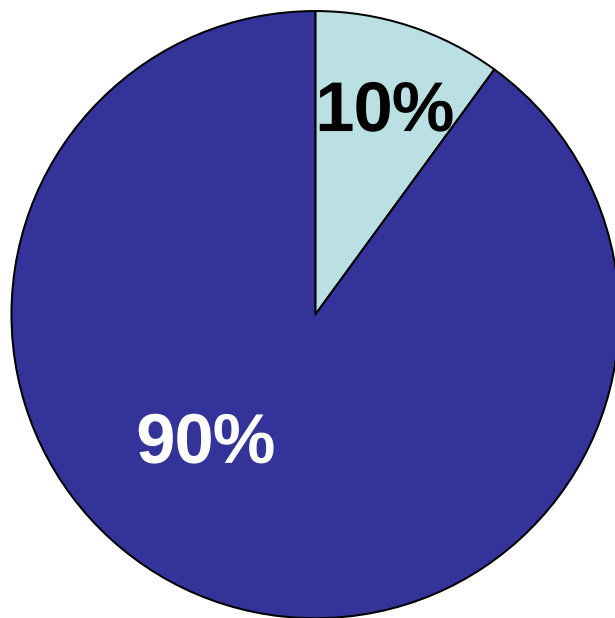
LID Practices	Rooftop	Non-Rooftop Impervious Areas	Disturbed Pervious Areas (Lawn)
Underdrain Soil Filters			
Bioretention System	●	●	●
Rain Garden	●	●	●
Swale	●	●	●
Vegetated Buffer	●	●	●
Infiltration Practices¹			
Dry well	●	○	○
Infiltration Trench	●	●	○
Pervious Pavement	○	●	○
Rain Barrel/ Cistern	●	○	○
Green Roof	●	○	○
Stormwater Planter	●	○	○
Micro-bio Inlet	○	●	●

Key: ● = suitable, ○ = unsuitable

Courtesy: Maine Coastal Program

Phosphorous Pollution in Lake Champlain, VT

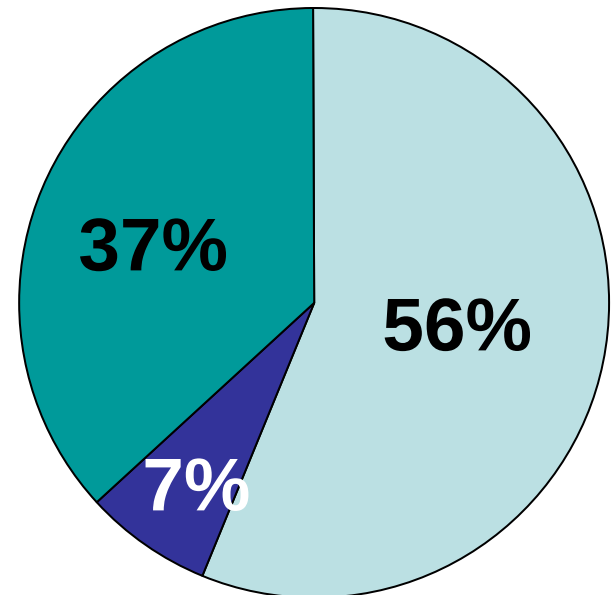
Point vs. Nonpoint



■ Point Source

■ Nonpoint Source

Sources of Nonpoint



■ Agriculture

■ Forested Land

■ Urban/Developed Land



Credit: Metro Wastewater Partners

Stormwater & Phosphorous Pollution

- Education & Outreach Program
- Discourages the use of phosphorous fertilizer on lawns.
- Required by the Lake Champlain Phosphorous TMDL

Contacts

General Information

Jessica Andreoletti

Winooski Natural Resources Conservation District

jessica.andreoletti@vt.nacdnet.net

802-865-7895 x14

LIDAR Information

Helena Vladich

Gund Institute for Ecological Economics

Rubinstein School of Environment and Natural Resources

helena.vladich@uvm.edu

802-656-2985