

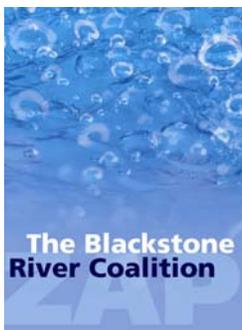
Reducing pollutants: Water running off our lawns, roads, and other surfaces picks up nutrients, bacteria, and chemicals, carries them to stormdrains in the roads, and then deposits them directly into streams in the Blackstone watershed. These pollutants can cause a variety of problems for living things — including humans — that live in or interact with our streams. For example, extra nutrients from fertilizer cause too much algae to grow, which robs the water of oxygen and makes it a bad place for fish, snails, and other stream critters to live. If the stream isn't a healthy habitat for these critters, this in turn affects animals that are higher in the food chain, like mammals and birds.

Reducing storm water volume: Another major problem for the streams in the Blackstone River watershed is the sheer volume of storm water that flows into them. As the land becomes more and more developed, impervious surfaces like roads, parking lots, driveways and rooftops generate more and more runoff. Because there are fewer and fewer vegetated areas, there is less and less infiltration of rainwater.

Storm water from all parts of the watershed is concentrated in the storm drain system and carried to our streams at very high speeds. When the water finally reaches the streams, it blasts adjacent stream channels, causing them to become wider and deeper. The soil eroded from stream banks during storms smothers aquatic habitat in the Blackstone River watershed. Over time, this sediment is carried downstream to Narragansett Bay, where it combines with sediment from other urban streams in the Bay. Sediment is one reason that the Bay is unhealthy.

Reducing water consumption: Water that we consume in the Blackstone watershed eventually flows back into the Blackstone watershed, either through septic systems, wastewater treatment plants, or untreated into our storm drains. Using less tap water prevents unnecessary chemical treatment and disposal from the treatment plant, and save you money on your water bill. By not overwatering your yard, you can help prevent too much water — and pollutants — from entering the streams in the watershed.

As you decide which actions to do, remember this: The actions you learn about will reduce both pollutants and the volume of storm water entering the stream from your yard.



The Blackstone River Coalition is a partnership of numerous organizations working to restore the Blackstone River and improve the health of its watershed. For more information contact BRC Coordinator Peter Coffin at 508-753-6087 or peter.coffin@zaptheblackstone.org.

This guide was developed by Mass Audubon for the BRC, with partial funding from Southold Meadow Farm, Auburn, MA. It is adapted from the Watershed Approach to Stream Health (WASH) Project.



Campaign for a Fishable/Swimmable Blackstone River by 2015

“Greening” Your Lawn and Gardens

Lawns/ Gardens

Reducing Your Use of Fertilizer, Toxic Pesticides, and Herbicide on Your Lawn and Gardens

WHY?

Car Care

Whether you are growing grass, beautiful flowers or delicious vegetables, consider doing this without using fertilizers, toxic pesticides, and herbicides.

Pet Waste



Lawn: If you have a lawn, you may be using fertilizers and weed killers to keep it green and weed-free. When it rains, these chemicals are washed into the street. **Storm drains** in the streets collect the runoff and empty it untreated into the nearest waterway. So, when you fertilize or treat your lawn, you could also be fertilizing or harming our lakes and streams. Fertilizer encourages algae growth. This can form large algae blooms and uses up oxygen that fish and other critters need to survive. Pesticides kill aquatic insects and herbicides kill aquatic plants, both of which fish and other species need to survive.

Clean Dishes/ Clean Streams

Gardens: In your gardens, herbicides and pesticides can harm children, pets, and local wildlife and kill helpful insects such as ladybugs and green lacewings that keep real pests in check. Even when used sparingly, these chemicals can end up washing down storm drains, into streams and eventually polluting the local water supply.

Rooftop Runoff

Here's how to create a natural lawn and help protect the health of your family, wildlife, and our local resources.



<http://www.lismore.nsw.gov>

Household Hazardous Waste

HOW?

- ◆ Get your soil tested and apply fertilizers only at the appropriate time in the right amounts. UMass Extension and URI Extension can help you test your soil and have information about chemical-free lawn and garden care.

- ◆ To naturally strengthen the resistance of your plants and lawn to pests, build healthy soil by adding organic matter such as compost. Make your own compost or purchase it.

- ◆ If you fertilize at all, it's better to use compost instead of chemical fertilizers. Fertilizers act as pollutants once they enter our waterways.

- ◆ If compost doesn't work for you, then use an organic or slow-release fertilizer. A slow-release fertilizer has at least half of the nitrogen in water insoluble form. These fertilizers gradually release nitrogen to plant roots. This provides a steady supply of plant nutrients over an extended period of time. Because you need less fertilizer, you will save time and money.

Stream Buffers

- ◆ Select a fertilizer with low or no phosphorus. Most lawns already contain enough phosphorus. Excess phosphorus is the primary culprit of algae blooms in our lakes.

- ◆ Make fertilizer-free zones of at least 20 feet from the edge of lakes, streams or storm drains.

More →

Campaign for a Fishable/Swimmable Blackstone River by 2015

Cleaner Car Care

Lawns/
Gardens

Fixing oil and antifreeze leaks, and getting clean on the green

WHY?

Car Care



Leaks: Oil, antifreeze and other fluids that leak from your car are washed from your driveway into the street, and then into **storm drains** that flow directly into our Blackstone watershed waterways. In the U.S., it is estimated that petroleum



Pet Waste

washed off the pavement every year, along with dirty oil dumped directly into storm drains, sends 15 times more oil into the ocean than the Exxon Valdez did. One pint of motor oil can contaminate 125,000 gallons of drinking water and make an oil slick about the size of two football fields.

Clean
Dishes/
Clean
Streams

Washing: How and where you wash your vehicle makes a difference to our local environment! The soap, together with dirt and oil washed from your vehicle, can find its way to local streams, wells and groundwater through storm drains, which are not linked to a water treatment plant. Runoff of excess phosphorous from cleaning products can contribute to the decline in health of our local streams. Phosphorus acts as a nutrient or fertilizer for aquatic plants, causing excessive growth. This pollution harms water quality and aquatic life.



<http://www.lismore.nsw.gov>

Rooftop
Runoff

Household
Hazardous
Waste

Here's how you can reduce harmful oil and cleaning-product runoff from your vehicle.

HOW?

Leaks:

Pervious
Surfaces

- ◆ If you notice vehicle fluids on your driveway, call your local repair shop to fix it, or repair it as soon as possible. If you change your own oil, return the used motor oil to the place where you bought it for recycling – it's the law in Massachusetts. Also you can check with your Department of Public Works to see if they collect it. Never pour it down the storm drain.

Stream
Buffers

- ◆ Clean up spills immediately. Use a non-toxic biodegradable chemical from your local hardware store that will safely break down oil deposits, or use kitty litter to soak up oil. Place it in your garbage can in a sealed bag. Do not hose fluids into the street where they can eventually reach local streams and lakes.
- ◆ When parked in your driveway, keep a drip pan under the leak until you repair it. Empty the collected fluids into a tightly sealed and labeled container, and recycle it.

more →

Campaign for a Fishable/Swimmable Blackstone River by 2015

Poop Pickup

Lawns/
Gardens

Cleaning Up After Your Dog



WHY?

Car Care



Poop pollutes. Thousands of dogs live in the Blackstone watershed and their waste is a health risk when deposited on streets and lawns.

It can be washed down **storm drains** and end up in our brooks, streams and rivers, and lakes and ponds. The bacteria, together with other pollutants, can make the water unsafe for swimming and cause health hazards for humans and aquatic life.

Pet Waste

It may be difficult to picture how one dog depositing a small amount of animal waste here and there can result in potential water pollution, but studies have shown that the cumulative impact of waste from all the pets, livestock, and resident waterfowl within a watershed can have a significant impact on water quality. Here's how to take care of your pet's poop without polluting your neighborhood and its water quality.

Clean
Dishes/
Clean
Streams

HOW?

Rooftop
Runoff

- ◆ When walking your dog, bring a small trowel or "pooper-scooper" and a plastic bag.
- ◆ Make sure your pet does not pee directly on the pavement. It is less likely the next rainstorm will wash the waste into the storm drains or local tributaries.
- ◆ After your pet does its business, scoop the poop and place it in the bag. Tie it shut until you get home.
- ◆ Flush the poop down the toilet or place the bag in your garbage can.

Household
Hazardous
Waste

- ◆ It's not just your dog! Feeding ducks and geese may seem harmless but, in fact, can be a nuisance to people and harmful to our water. Feeding waterfowl causes them to become dependent on humans. This, in turn, creates unnaturally high populations and problems in our parks and lakes. Waterfowl waste can pollute our water with harmful bacteria.

Pervious
Surfaces

RESOURCES

<http://www.uri.edu/ce/healthylandscapes/tips/7.html>

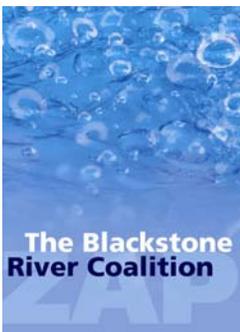
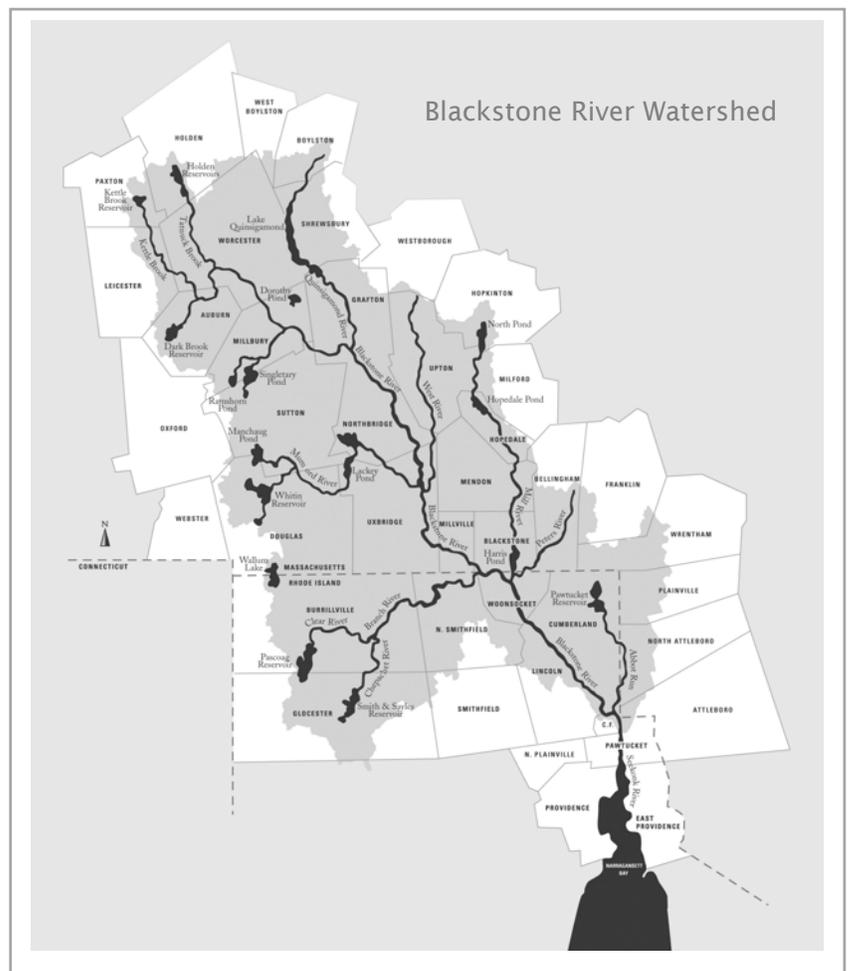
Stream
Buffers

BENEFITS

You help keep the watershed healthy, protecting fish and wildlife habitats. You also make your neighborhood more enjoyable.

more →

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Campaign for a Fishable/Swimmable Blackstone River by 2015

Clean Dishes and Clean Streams



Lawns/
Gardens

Using phosphate-free detergent in your dishwasher

WHY?

Dirty soapy water from your dishwasher flows into your septic system, and can leach into the nearest waterway, bringing with it lots of phosphorus. Phosphorus is a nutrient and causes excessive aquatic plant growth, maybe in your local swimming area. Even if your home is sewer, treatment plants don't remove all phosphorus, discharging some to waterways.

Car Care

Pet Waste

HOW?

◆ You can help improve water quality by using no- or low-phosphorus dishwasher detergent. Read labels and make sure phosphorus is not a listed ingredient. Most common brands of dishwasher detergent contain phosphorus, with the amount varying considerably by brand and by type, with the lesser amounts in gels and liquids, and greater amounts in powders and tablets/pacs. The chart shows percentage of phosphate by brand and type.

Clean
Dishes/
Clean
Streams

Rooftop
Runoff

Household
Hazardous
Waste

RESOURCES

This shelf survey was conducted at Big Y, Hannaford, Market Basket, Shaw's, Stop & Shop and Trader Joe's. Information is from the Mass. Department of Environmental Protection and the New Hampshire Department of Environmental Services website
<http://www.des.state.nh.us/bb.htm>

Pervious
Surfaces

Stream
Buffers

BENEFITS

You reduce the amount of phosphorus entering our waterways and the wastewater treatment plants.

Automatic Dishwasher Detergent	% Phosphorus
Gel/Liquid	
Citrus Magic	0
Seventh Generation	0
Palmolive Gel	3.3
Electrasol Gel	3.7
Hannaford Gel	4.0
Best Yet Gel	4.0
Sunlight Gel	4.3
Cascade Liquid	4.5
Cascade Gel	4.5
Cascade Complete	5.0
Powder	
Trader Joe's	0
Electrasol	4.5
Sunlight 2 in 1	4.5
Hannaford	5.3
Cascade	6.4
Cascade Complete	6.9
Tablets/Pacs	
Sun & Earth Concentrated Pacs	0
Market Basket Tabs	8.0
Cascade 2-1 Pacs	8.0
Sunlight 3 in 1 Pacs	8.6
Electrasol Tabs	8.7
Electrasol 3 in 1 Tabs	8.7
Electrasol Gel Pacs	8.7
Dishwashing Liquid	
No phosphates allowed	0
Laundry Detergent	
No phosphates allowed	0

more →

Campaign for a Fishable/Swimmable Blackstone River by 2015

Rooftop Runoff - Harvesting Rainwater

Lawns/
Gardens

Redirecting downspouts, collecting rainwater in rain barrels, and creating rain gardens can cut down on your water bill as well as protect water quality.

WHY?

Car Care



Water running off your roof during a rainstorm can be part of the problem — or a resource you can put to good use! On many properties in the Blackstone watershed, rooftop runoff from the gutter and downspout drains to the driveway or onto yards with compacted clay soil. In either case, it eventually flows into **storm drains** in the road and directly into our local streams, often causing flooding. Reducing storm water runoff is the first step to reviving life in urban streams.

Pet Waste

Clean
Dishes/
Clean
Streams

What's a rain garden? A rain garden is an attractive native plant garden with a special purpose: to reduce the amount of stormwater that rushes into our streams and other waterways. It is constructed as a place to direct the stormwater that falls on your property and is landscaped with water-loving native plant species. By creating a rain garden in your yard, you can use rain the way nature intended — instead of wasting this valuable resource!



http://nemo.uconn.edu/tools/publications/rain_garden_broch.pdf

Rooftop
Runoff

Here's how to divert rainwater runoff away from hard surfaces and create rain gardens to infiltrate more, so that you can help support aquatic life and reduce stream bank erosion. What's more, rainwater diversion can help you save water for use in your yard, eliminate potential flooding in your basement, and reduce your water bill.

Household
Hazardous
Waste

HOW?

Redirect downspouts:

◆ Check your gutters and roof drains and remove any leaves or other debris that may block water flow. If leaf accumulation is a recurring problem, consider installing commercial gutter shields.

◆ If your roof drain downspouts discharge to your driveway or too close to the house, install extensions that carry the water at least six feet away from the driveway or foundation to a vegetated area of your yard. Use additional pieces of downspout or open gutters for the extensions. Place a splash block at the end of the extension to spread out the water as it runs onto your lawn. This reduces the potential for soil erosion.

◆ Or you can collect runoff in a rain barrel to use for irrigation. Cut off your downspout at an appropriate distance from the ground, and place a rain barrel underneath. Place screening over it to protect it from leaf litter and mosquitoes. Attach a hose to the spigot or use a watering can.



Pervious
Surfaces

Stream
Buffers

more →

Create Rain Gardens:

- ◆ Look for low-lying areas of your yard where water tends to run or collect during a rainstorm.
- ◆ Dig out the soil 2-4 feet down, taking care not to destroy any significant roots of nearby trees.
- ◆ Mix shredded leaf mulch (available from your municipality) with the soil that you have removed. Refill the hole.
- ◆ Place a berm (small mound) along the lower edge of the area you've selected, so you can capture and retain stormwater.
- ◆ Plant the garden with water-loving native plants that can handle alternately very wet and dry conditions.

RESOURCES

Rain Garden How-To: http://nemo.uconn.edu/tools/publications/rain_garden_broch.pdf
<http://clean-water.uwex.edu/pubs/home.htm#yard>
<http://www.uri.edu/ce/healthylandscapes/rainbsources.html>

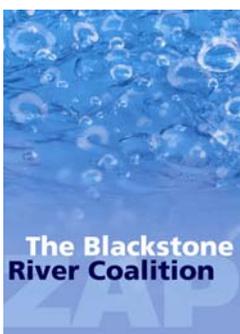
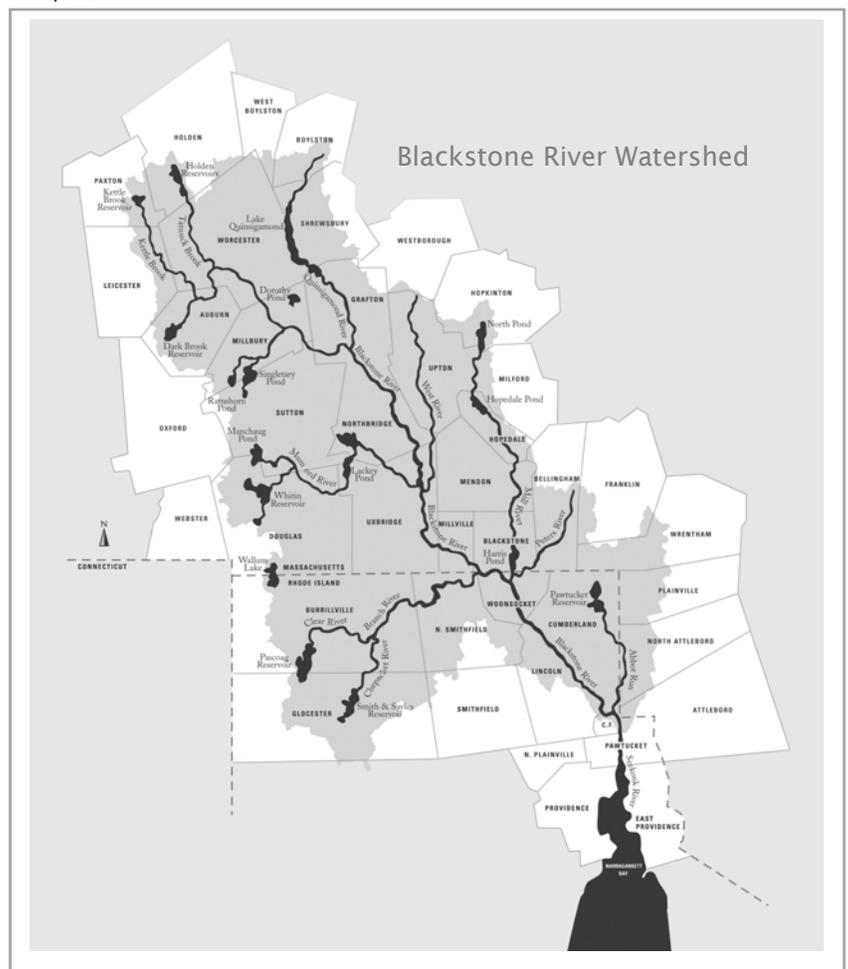
Visit Mass Audubon's demonstration rain garden at Broad Meadow Brook Conservation Center, 414 Massasoit Road, Worcester, MA.

BENEFITS

You reduce the volume of stormwater entering our streams, while creating a source of water for your yard between rainfalls. You also save money on your water and sewer bills.

Your rain garden will help keep water in the ground – where it belongs! It will also add an attractive and interesting new element to your landscaping.

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Campaign for a Fishable/Swimmable Blackstone River by 2015

H2W – Household Hazardous Waste

Lawns/
Gardens

Carefully storing and disposing of household cleaners, chemicals, and oils



WHY?

Car Care



Pet Waste

Antifreeze, household cleaners, gasoline, pesticides, oil paints, solvents, and motor oil are just some of the common household products that can enter our **storm drains**. Help keep these out of our lakes and streams. Instead of putting these items in the trash, down the storm drain, or on the ground, take them to a local hazardous waste center or collection day.

HOW?

Clean
Dishes/
Clean
Streams

Here are some simple steps you can take to carefully dispose of household wastes and help keep our water clean. Give them a try. A few simple changes can make a big difference!

Rooftop
Runoff

- ◆ Identify it. Be aware of household products that can harm children, pets, and the environment. The words "danger," "caution," "warning," or "toxic" indicate that you need to be careful in how you use and dispose of the product.

- ◆ Less is better. Reduce waste and save money by purchasing only the materials you need. When possible, choose less toxic alternatives. For example, try cleaning your windows with vinegar and water.

Household
Hazardous
Waste

- ◆ Store properly. Keep unused products in their original containers with labels intact. Select cool, dry storage areas that are away from children, pets, and wildlife.

Pervious
Surfaces

- ◆ Disposal is key. Never dump motor oil, chemicals, and other toxic materials down storm drains, sinks, or on the ground. Contact your local community for disposal locations, guidelines, and dates.

- ◆ Don't forget the RV. Dispose of recreational vehicle sanitary waste at a nearby drop-off location. Never put it down a storm drain or roadside ditch!

Stream
Buffers

RESOURCES

<http://www.uri.edu/ce/wq/has/PDFs/WQP.Hazardous.pdf>

For more information on RV dump locations and requirements:

MA: <http://www.rvdumps.com/dumpstations/node/46>

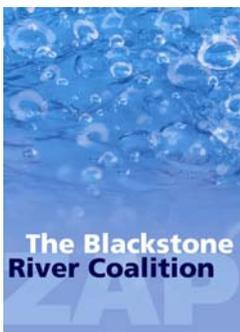
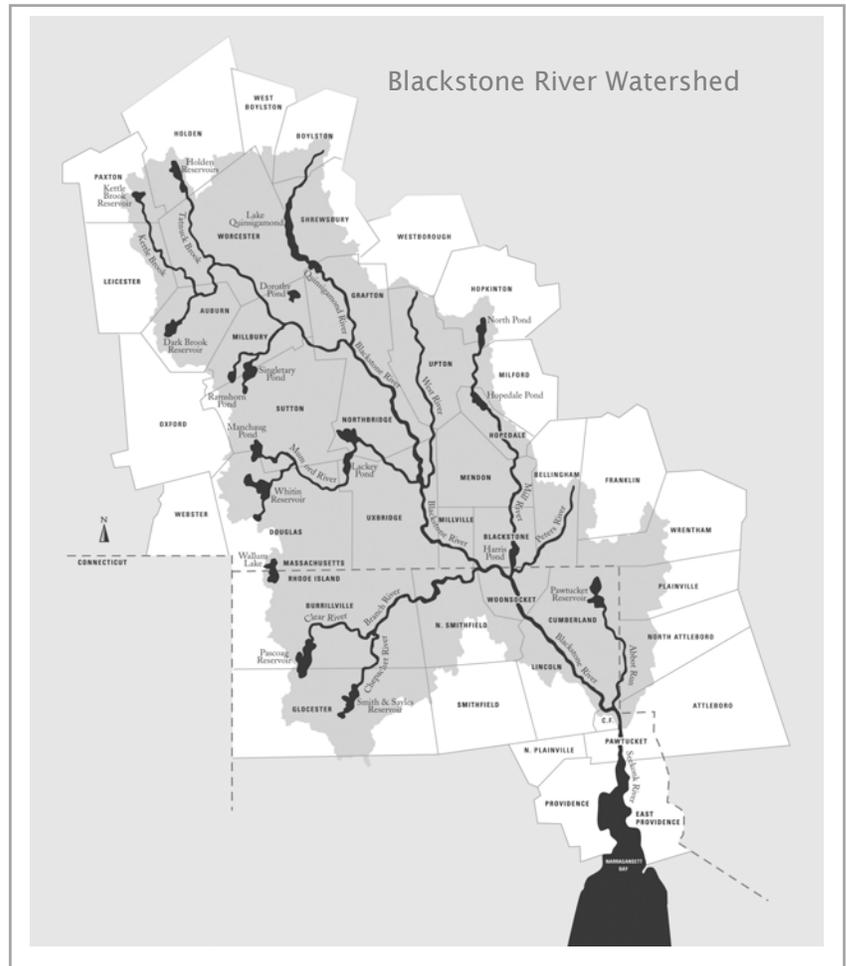
RI: <http://www.rvdumps.com/dumpstations/node/65>

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BENEFITS

By keeping these toxic materials out of our waterways, you make living much easier for aquatic critters and plants.

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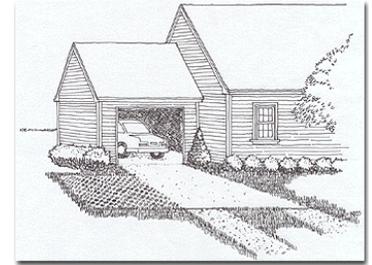
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Campaign for a Fishable/Swimmable Blackstone River by 2015

Homeowners: UNPAVE!



Lawns/
Gardens

Reducing paved surfaces

WHY?

Car Care



This is one of the most important actions you can take toward helping to improve our local streams in the Blackstone watershed. Did you ever consider how much water runs off your property during a rainstorm? Every time there's a heavy rain, hundreds—even thousands—of gallons of water fall on your roof, driveway, patio, and other paved surfaces. These surfaces are called “impervious” because it is impossible for the water to penetrate them.

Pet Waste

Instead of seeping back into the ground, the water rushes from your property into **storm drains**, picking up chemicals, litter, oil and other pollutants along the way. From the storm drains, it flows directly into local streams, untreated. The large volume of water that flows into our streams during a rainstorm flushes life out of our waterways, erodes stream banks, recedes quickly, and leaves excessively low levels of water in the stream after a rain. Storm water running off of impervious surfaces does not infiltrate to ground water, so there is less recharge in our streams. Our streams are “flashier”, with higher high water and lower low water.

Clean
Dishes/
Clean
Streams

Rooftop
Runoff

Here's how you can reduce runoff from your property and infiltrate more.

HOW?

Household
Hazardous
Waste

- ◆ Analyze how much of your property is covered with paved surface. Make a list of all of the impervious surfaces, including your roof, driveway, patio, and other paved areas.
- ◆ When it comes time to repave your driveway, front walk, or other pathways, choose gravel, wood mulch, or open-design pavers such as flat stones, bricks, pre-cast concrete lattice pavers, or pervious concrete. Place the new cover on well-drained soil or on a sand or gravel bed, so that rainwater can soak into the ground. (If weeds grow in the spaces between pavers, consider introducing moss as a natural way to crowd out weeds and make the area more attractive.)
- ◆ If you want to take action right away, decide where you could most easily remove impervious surface and replace it with wood mulch, gravel, soil, or alternative pavers.

Pervious
Surfaces

Stream
Buffers

- Start with one small area or project, and expand from there.
- Remove the paved surface or compacted soil using a pick or hire a contractor to remove the pavement for you.
- Break up the compacted soil underneath, and add shredded leaf mulch to help the soil retain water.
- Cover with the pervious surface of your choice, as indicated above.

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◆ If you're thinking about building an addition on your house, consider building up — not out.

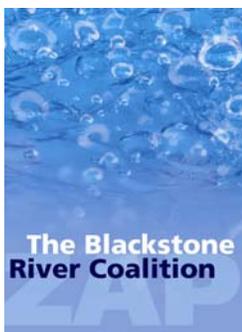
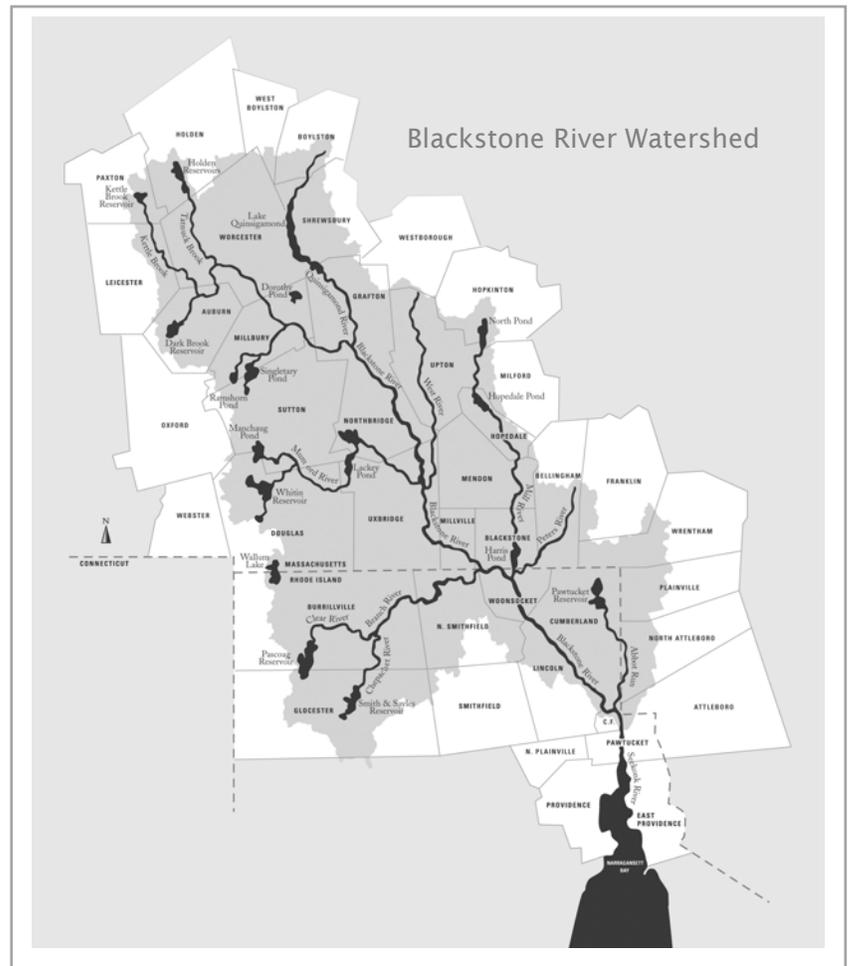
RESOURCES

http://www.recycleworks.org/greenbuilding/sus_impervioussurfaces.html
<http://www.spacreek.org/cn-storm.htm>

BENEFITS

By replacing hard surface with porous surface, you will allow water to be absorbed into the ground. Not only will you save thousands of gallons of rainwater from running into the storm drains and into the streams – you are helping to replenish our groundwater at a time when water is more precious than ever!

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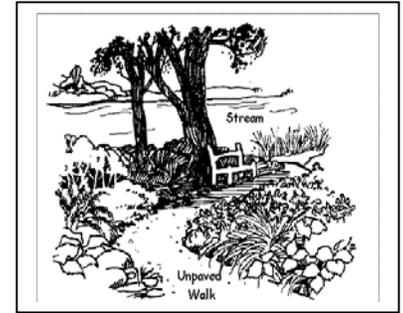
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Campaign for a Fishable/Swimmable Blackstone River by 2015

Life on the Edge – of a Waterway



dsf.chesco.org/

Lawns/
Gardens

Maintaining stream buffers and tree canopies

WHY?

Car Care

A key component for improving water quality is the protection of environmentally sensitive areas of vegetation that exist near streams, lakes and ponds, and wetland areas. These buffer areas help protect water quality in local streams and the mainstem of the Blackstone.

Pet Waste

Vegetated buffers and tree canopies along stream banks shade waterways thus keeping temperatures down and dissolved oxygen up, provide detritus in the stream that serves as food and shelter for aquatic species, and stabilize stream banks, stream channels and floodplains from the erosion and scour of high velocity flood flows. These buffers also serve as the link between terrestrial wildlife and their source of water, food and cover. The roots absorb and "take up" nutrients and other pollutants from ground water as it migrates through the root zone. Plant stems and leaves filter pollutants and sediment from overland flow of storm water through passing through the buffer.

Clean
Dishes/
Clean
Streams

Rooftop
Runoff

Buffers prevent lawn chemicals from entering the waterway. Fertilizers washing into aquatic systems can cause algae blooms, which can ruin swimming and boating opportunities, create foul taste and odor in drinking water, and kill fish by removing oxygen from the water. Buffers also prevent sedimentation from erosion. Too much sediment can cloud the water, reducing the amount of sunlight that reaches aquatic plants, and raising water temperature thus reducing oxygen. Sediment can also clog the gills of fish or smother fish larvae.

Household
Hazardous
Waste

It is very important to protect and restore stream buffers and tree canopy to help preserve these environmentally sensitive areas. If you are lucky enough to have a waterway or wetland on your property, you have a unique opportunity to help improve water quality in your neighborhood and the Blackstone River. Here's how to create, protect and maintain buffer areas.

Pervious
Surfaces

HOW?

Stream
Buffers

- ◆ Don't mow down to your stream. Leave at least 10 feet in native plant buffer to filter pollutants.
- ◆ If you fertilize your lawn, stop application at least 20 feet from water's edge to minimize runoff.
- ◆ Reduce surface water runoff and erosion by using permeable paving surfaces, directing runoff to planted areas and increasing groundwater recharge.



more →

- ◆ If your stream bank has begun to erode, seek expert help to repair it.
- ◆ Compost yard waste such as grass clippings, sticks, leaves, and brush; do not dump on the river's edge or into the water, as it can add nutrients that result in excessive aquatic plant growth just like fertilizer does.

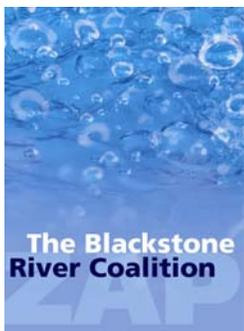
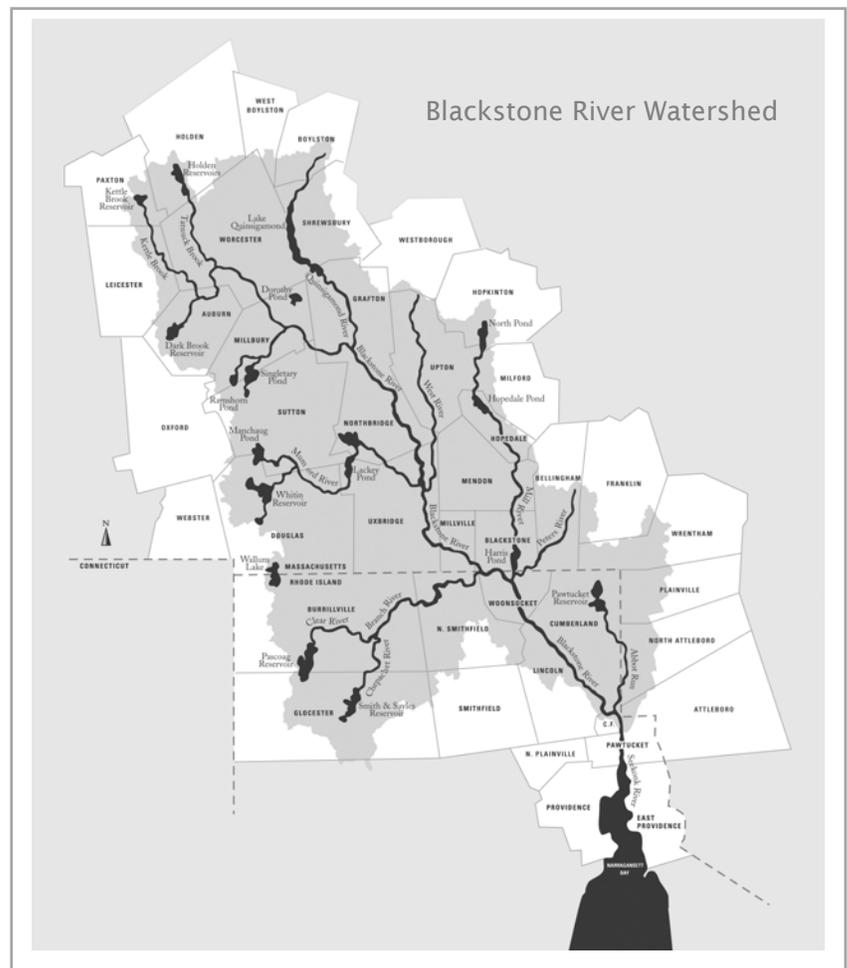
RESOURCES

http://www.uri.edu/ce/healthylandscapes/URI_HomeLandImprovement.pdf

BENEFITS

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