

Municipality/Organization: Town of Boxford

EPA NPDES Permit Number: MA 041184/MADEP

MaDEP Transmittal Number: W- 036290

Annual Report Number & Reporting Period: No. 11: May 12-May 13

NPDES PII Small MS4 General Permit Annual Report

Part I. General Information

Contact Person: John Dold

Title: Superintendent of Public Works

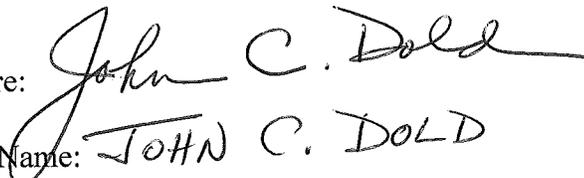
Telephone #: (978) 352-6555

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Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:



Printed Name:

JOHN C. DOLD

Title:

DPW SUPT / TOWN ENGINEER

Date:

APRIL 12, 2013

Part II. Self-Assessment

The Town of Boxford is on track to complete its obligations under the NPDES Phase II General Permit. Progress in meeting these obligations is detailed in Attachment A.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
1A	Distribute nonpoint source pollution posters	DPW Super	Post in all schools and town buildings	New messages posted, including North Shore "Greenscapes" program information and "Scoop It" program	"Greenscapes" program information and "Scoop It" program to be distributed at Town Meeting May 2013
1B	Broadcast stormwater messages on local access cable channel	Administrative Assistant to the Town Manager	Post one message every month	New messages broadcast on Boxford Cable Access, Boxford has worked with Ipswich River Watershed Association on developing regional watershed management program and conference	Continue to broadcast messages and "Boxford's Environment Matters," continue coordination with IRWA
1C	Add stormwater info to Town website	Web Committee, Health Agent, Conservation Director, DPW Director	Update info quarterly	"Greenscapes" Info added to Conservation and DPW Dept. pages.	Quarterly updates to be made.

2. Public Participation

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
2A	Form Stormwater Advisory Committee (SAC)	DPW Super	Hold meetings twice per year	SAC met twice in 2012	SAC to meet twice in 2013
2B	Hazardous waste collection	Recycling Committee	Hold waste collection annually	Held November 2012	To be held November 9, 2013
2C	Waste Oil collection and recycling	DPW Super	Collect from residents once per month	Collected once per month at Town recycling center	To be collected once per month at Town recycling center
2D	Implement a catch basin stenciling program	DPW Super	Stencil 25% of catch basins annually	Stenciling of all catch basins within the Urbanized Area was completed in 2008	Existing stenciled basins will be refreshed as needed.
2E	Hold a stream clean-up day	Lakes, Ponds and Streams Committee	Hold clean-up day annually	The Boxford Lakes Ponds and Streams Committee organized a clean-up of several Town waterbodies in 2012.	The Boxford Lakes Ponds and Streams Committee held a clean-up of several ponds on Earth Day 2012. The Boxford Lakes, Ponds and Streams Committee will organize future clean-ups in 2013.

3. Illicit Discharge Detection and Elimination

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
3A	Map outfalls and receiving waters	DPW Super/Conservation Dept.	Map 25% of outfalls in urban area per year	A final map of outfalls was completed in 2008	Done
3B	Review existing bylaws and regulations	Stormwater Advisory Committee	Determine if existing bylaws & regs fulfill EPA requirements	Done. The existing bylaws and regs fulfill requirements	Done
3C	Develop illicit discharge detection & elimination plan	Stormwater Advisory Committee	Make recommendations for inclusion into proposed plan	Potential pollutant "hotspot" activities have been incorporated into a Stormwater Management Bylaw. Boxford has no industry and very little commercial development. Septic discharge is controlled by the Board of Health (see attached measures)	Done
3D	Develop/modify general illicit discharge bylaw	Stormwater Advisory Committee	Propose recommendations for modifying plan	Potential pollutant "Hotspot" activities addressed in Stormwater Management Bylaw adopted at Spring Annual Town Meeting, May 2006.	Done
3E	Present bylaw for town meeting action	Stormwater Advisory Committee	Make presentations for Town	Proposed Bylaw was presented and adopted at Spring	Done. Stormwater Management

			meeting action	Annual Town Meeting, May 2006.	Regulations were adopted by The Conservation Commission in 2007.
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4. Construction and Site Runoff Control

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
4A	Review existing site inspection practices	Planning Dept/Conservation Dept	Determine if existing practices fulfill EPA requirements	Existing practices meet requirements	Inter-departmental inspectional practices continue to be reviewed and improved
4B	Develop/modify site inspection program	Planning Dept/Conservation Dept	Make recommendations for modifying program	Site inspections are incorporated into stormwater management bylaw, Title 5 permits, building permits, wetland permits	Done
4C	Review existing bylaws and regulations	Stormwater Advisory Committee	Determine if existing bylaws & regs fulfill EPA requirements	Existing bylaws and regulations do not meet existing requirements	Done
4D	Develop/modify bylaw for construction site runoff	Stormwater Advisory Committee	Propose recommendations for developing/modifying bylaw	Stormwater Management Bylaw adopted at Town Meeting, May 2006.	Done
4E	Present bylaw for town meeting action	Stormwater Advisory Committee	Make presentations for Town meeting action	Stormwater Management Bylaw adopted at Town Meeting, May 2006.	Done. Stormwater Management Regulations adopted by the Conservation Commission

5. Post Construction Runoff Control

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
5A	Review existing site inspection practices	Planning Dept/Conservation Dept	Determine if existing practices fulfill EPA requirements	Existing practices do not meet requirements	Done
5B	Develop/modify inspection and maintenance practices	Planning Dept/Conservation Dept	Make recommendations for modifying existing practices	Inspection and maintenance practices are incorporated into proposed stormwater management bylaw, Title 5, building permit, wetland permits.	Done, Driveway permit post construction inspectional practices are being reviewed and improved to better coordinate with building permit certificate of occupancy
5C	Review existing bylaws and regulations	Stormwater Advisory Committee	Determine if existing bylaws & regs fulfill EPA requirements	Existing bylaws and regulations do not meet existing requirements	Done
5D	Develop/modify bylaw for construction site runoff	Stormwater Advisory Committee	Propose recommendations for developing/modifying bylaw	Stormwater Management Bylaw adopted at Town Meeting, May 2006.	Done
5E	Present bylaw for town meeting action	Stormwater Advisory Committee	Make presentations for Town meeting action	Stormwater Management Bylaw adopted at Town Meeting, May 2006.	Done. Stormwater Management Regulations adopted by the Conservation Commission in 2007.

6. Municipal Good housekeeping

BMP ID#	BMP Description	Responsible Person	Measurable Goals	Progress on Goals Permit Yr 11	Planned Activities
6A	Street sweeping program	DPW Super	Sweep all streets once per year	All streets are swept once per year per contract with third party vendor. Town purchased a street sweeper in 2012 to better manage the street sweeping program.	All streets will be swept in 2013, and will be swept annually. New sweeper purchased by DPW will allow more frequent maintenance of sensitive areas around salt shed and public water supply wells
6B	Catch basin cleaning program	DPW Super	Clean all basins once per year	All basins cleaned once per year per contract with third party vendor and all excavate disposed of in a secure landfill.	All basins will be cleaned in fall 2013 and annually thereafter.
6C	Perform site visits to examine existing practices at facilities	DPW Super	Target all applicable municipal facilities	Site visits of all other municipal facilities were conducted in 2012. A new culvert and tight tank has been designed for the West Fire Station and a new tight tank for the East Fire Station to eliminate all discharge of floor drain runoff to leaching field.	Regular inspections of all facilities will continue in 2013. Installation of culvert and tight tanks at fire stations will be completed in 2013.
6D	Train municipal employees at each facility	DPW Super	Target all applicable municipal facilities	Training of DPW personnel was held in 2012. The Building Department is	On-going Training of DPW personnel and other Town employees will

				conducting Safety training pursuant to 780 MGL 110 for facility personnel in all facilities, including handling of hazardous materials and potential pollutants	be held in 2013.
6E	Perform follow-ups to ensure required practices are met	DPW Super	Target all applicable municipal facilities	Site visit program was continued. Building Department monitors waste disposal affidavits relating to construction debris – see attached sample. Boxford contracts with Clean Harbors to ensure proper reporting for hazardous materials disposal	Site visit and training programs will be continued in 2013



TOWN OF BOXFORD

WASTE AFFIDAVIT

As a result of the provisions of MGL Ch.40-s54, I acknowledge that as a condition of building permit # _____ all debris resulting from the construction activity governed by this building permit shall be disposed of in a properly licensed solid waste disposal facility, as defined by MGL Ch.111-s150A.

Waste Disposal or
Solid Waste Facility _____

Address _____

Town/City, State, Zip _____

Date _____ Signature of applicant _____

Location of construction _____

Roads, Runoff and Water Management in Northeastern, MA

A Free Conference in the Areas of Stormwater Management , Water Conservation & Road-Stream Crossings

Helping Towns Navigate the New Water Rules with Cost Effective, Sustainable Solutions

Thursday, April 11th
8:30 am to 1 pm
Lunch provided

Workshop Description

This conference will explore the current science and emerging regulatory requirements in the areas of **Water Conservation, Stormwater Management** and **Road-Stream Crossings** (bridges and culverts) and provide cost-effective tools to respond to the new regulations in these areas. Expert speakers will focus on ways that municipalities can work proactively toward meeting the new requirements while protecting the environment.

Topics & Speakers

- **Water Resources in the Region:**
The structure and function of our coastal watersheds and how local actions affect the broader region
~ *Anne Giblin, Marine Biological Laboratory*
- **Stormwater Management & New Regulations:**
Overview of stormwater management including changes to stormwater and water management regulations
~ *Scott Horsley, Horsley Witten Group*
- **Implementing Water Conservation:**
Water conservation and leak detection measures from the perspective of a municipal water department
~ *Greg Krom, Topsfield Water Department*
- **Roads, Rivers and Stream Crossing Standards:**
Opportunities to design bridges and culverts that improve public safety and watershed health while saving money
~ *Amy Singler, American Rivers*



Who should attend

- Municipal highway, planning, water supply and DPW staff, Town Managers, conservation agents, planners and other municipal officials.
- Municipal board members including conservation commissions, planning boards, road commissions and water commissions

Location

Coolidge Hall, Topsfield Fairgrounds
207 Boston Street, Route 1
Topsfield, MA

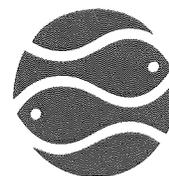
Registration

Pre-registration is required. Please register by emailing Cynthia at cingelfinger@ipswichriver.org or call 978-412-8200 by April 1st, 2013.

Presenting Sponsors

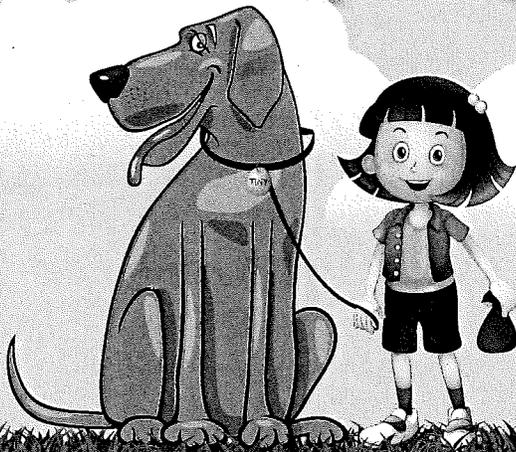
Cy Pres Anti-Trust Settlement funds
Jessie B. Cox Trust
Sheehan Family Foundation

Hosted by the Ipswich River Watershed Association
and the Parker-Ipswich-Essex Rivers Restoration Partnership
<http://pie-rivers.org/>



IPSWICH RIVER
WATERSHED
ASSOCIATION
The Voice of the River

Scoop it!



Scoop the Poop— Whenever and Wherever

...even in your own yard,
...even in the woods or remote locations,
...even in the snow,
...even if you have a small dog.

- **Always bring bags**
Be prepared, bring more than one.
- **Always put filled bags in trash cans!**
Even bio-degradable bags.
- **Never put dog waste into a storm drain!**
Storm drains flow directly into our local waters — they are not connected to the sanitary sewer.
- **Never leave bags of poop**
by the side of the road, in bushes, or lying around.

Scooping Poop is not just about
the mess — it's about
clean water and our health!

www.greenskapes.org

We poop.
You pick it up.
Any questions?



Did you know? Unscoped poop pollutes our water!

Doggy doo has twice as much bacteria as human waste!

Rain washes the bacteria into the nearest river. It ends up in the ocean.

Kids are most affected! Symptoms are flu-like, vomiting, diarrhea, ear infections, rashes, fever.

All dogs pollute, even small dogs! Consider this:

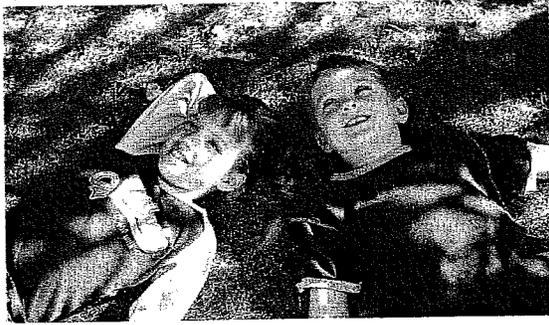
A 40 lb. dog produces 7.8 billion fecal coliform bacteria per day!

Giardia, Salmonella, and Campylobacter are some of the parasites, viruses and bacteria in doggy poo that can be transmitted to humans.

greenskapes

www.greenskapes.org

Produced by Greenscapes Massachusetts Coalition,
Ipswich River Watershed Association
MVPOB Towns and the Great Marsh
North & South Rivers Watershed Association
Salem Sound Coastwatch



Greenscapes Coalition
c/o SSCW
120 Washington St. #9
Salem, MA 01970



www.greenscapes.org

How to have a beautiful yard the natural way...

Inside:

- Watering tips that can save gallons of water
- How mowing properly can cut down on weeds
- Which plants need very little care
- Healthy alternatives to pesticides and herbicides
- No-cost fertilizing techniques
- Which grass seed grows best

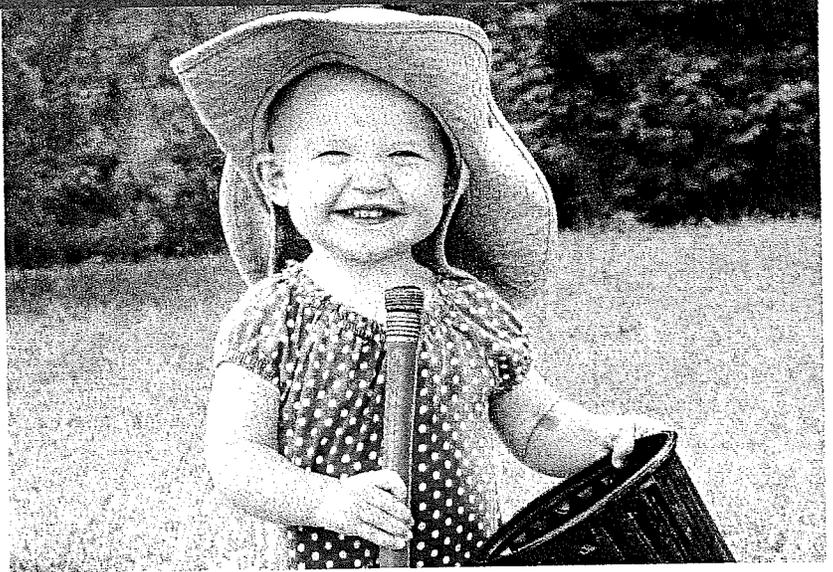
Greenscapes Guide

Creating a beautiful healthy yard the natural way...



**Saving you time and money...
and protecting our water**

www.greenscapes.org



What Are Greenscapes?

Healthy, beautiful yards that protect our water

Greenscapes are yards bursting with color and visual interest that are easy, efficient and cost-effective to maintain. Greenscaping drastically lowers water consumption and lets nature do most of the work to keep our yards beautiful.

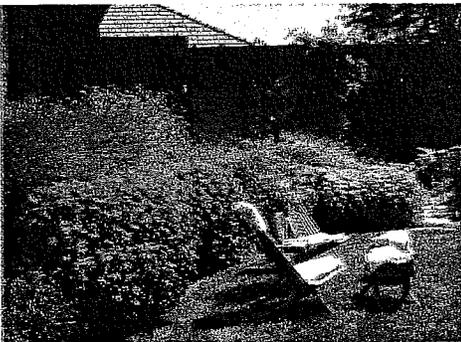
The goal of Greenscapes is to use practices that encourage healthy plant growth with deep roots and rich, fertile soil. These practices, provided by nature itself, will help your yard naturally resist drought, weeds and disease.

Why Should I Greenscape?

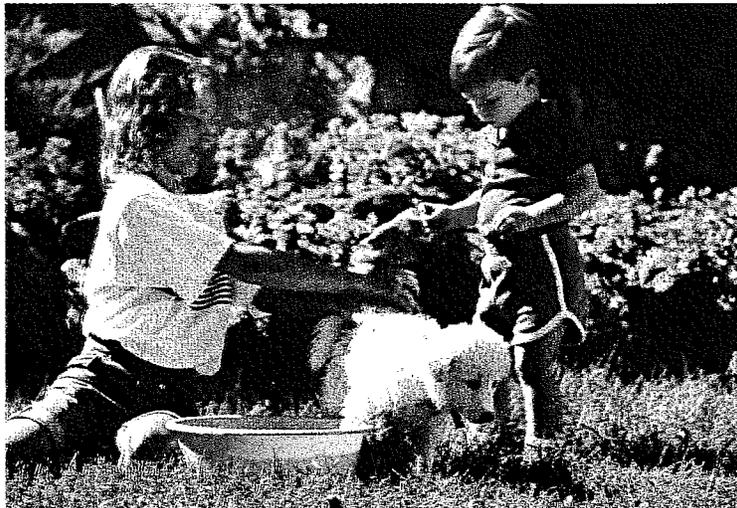
Greenscapes are good for your family, your wallet and our environment. By following the recommendations in this Guide, you will:

Increase your property values

By spending 5% of the value of your home on the installation of a quality low-maintenance landscape, you can boost the resale value of your property by 15%, earning back 150% or more of your landscape investment. (source: Smart Money)



A beautiful and functional Greenscape with low-maintenance plants full of color and interest framing the lawn's recreational area.



Save money on your utility bills

Properly selecting and placing native plants can lower costs for heating and cooling 20% or more. Select deciduous trees (trees that shed their leaves in winter) for summer shade and evergreens for winter windbreaks. (source: U.S. Department of Energy)

By far the biggest savings come from switching from a chemically-treated lawn to natural turf. Savings in water costs alone, not including the chemicals and labor, can be between 33-50%. (source: Grassroots Environmental Education)

Nurture a healthy environment for your family

Yards are places for families to congregate and play. Being out in nature is a great stress-reliever and has been proven to increase our well-being. Plants cleanse the air we breathe; gardens can give us a bounty of fresh foods.

Using Greenscapes techniques, pesticides, herbicides and synthetic fertilizers are replaced by natural processes – very important since studies have shown these synthetic products can cause many health problems. For instance, just with normal exposure to household garden pesticides, the risk of childhood leukemia increases seven-fold, according to the National Cancer Institute.

Create more habitat for wildlife

Planting native plants in place of a closely-mowed lawn will bring more wildlife to your yard. Native plants attract birds, butterflies and other wildlife that have adapted over centuries to using them as a food source.

Enjoy more free time by doing less landscape maintenance

Once established, natural areas require significantly less money and time to take care of than lawn. According to research, converting one acre from manicured lawn to a natural landscape could save as much as \$4500 per year! Also, in a study comparing manicured lawns to natural landscapes, the natural landscape saved 25% in labor costs, 61% for fertilizer, 44% for fuel and 22% for herbicides. (source: Center for Watershed Protection)

Reduce stormwater pollution

The EPA estimates that nearly 70% of the pollution in our rivers, ponds and oceans comes from stormwater runoff. Stormwater runoff is the rain that runs across driveways, lawns, roads and parking lots carrying pollution into storm drains, which eventually ends up in our local waterways. The EPA estimates that 50% of all stormwater pollution is chemical pollution from the products we use on our yards.

Protect your community's water resources

In order to have enough water for public safety and to allow our water supply to replenish, MA Department of Environmental Protection recommends each person use no more than 65 gallons per person per day. Yet watering lawns consumes vast quantities of water – in fact the U.S. Geological Survey points out that of the 26 billion gallons of water consumed daily in the United States, 30% is devoted to outdoor uses, mostly landscaping. In most towns water consumption nearly doubles due to lawn watering during the summer.

There is a better way...

How Do I Greenscape?

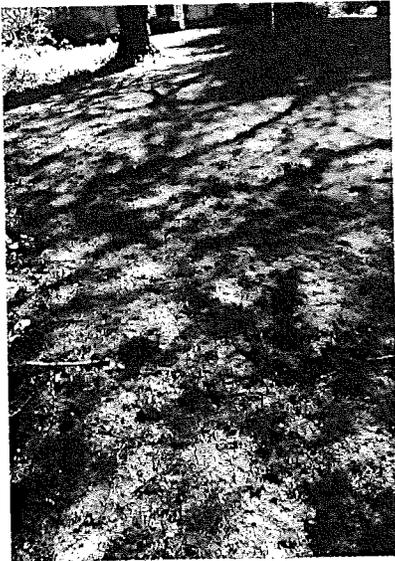
The first place to start is by deciding to get your lawns off drugs! Commercial fertilizers, herbicides and pesticides are like fast food – they fill you up and taste good but hurt your health. That's the same with synthetic lawn products, which rob the soil of vital nutrients and microbes, requiring more and more applications of fertilizers and chemicals to compensate.

FACT: Grass will outcompete weeds if given the right soil conditions!

The Greenscapes Guide will tell you in depth what you need to know about getting a healthy, beautiful Greenscapes yard, but here is a brief overview of steps to take to get started.

Getting started

- 1. Go cold turkey** - Don't make a slow transition when you stop applying synthetic lawn products and move to a natural regimen.
- 2. Get your soil tested** - This is imperative, because you must know your soil's deficiencies, including pH levels, to provide the right soil



The Proof is Plain to See

The yard on the left is a chemically-treated yard, before seasonal chemicals have been applied. The yard on the right is a Greenscapes yard - free of chemicals. Photos taken May 2011 by Greenscapes Manager Debbie Cook

conditions for healthy root growth. Go to www.umass.edu/plsoils/soiltest to get information about the UMass Extension's soil test, which is comprehensive and very inexpensive!

3. Add the soil amendments that the test results suggest.

4. Top dress with compost - Put ½" of compost on your lawn. Compost provides organic matter, teeming with microbes, that will make your soil more porous and nutrient-rich.

5. Overseed in the spring and the fall Mowing does not let grasses form the seed heads necessary for them to self-sow, which is why overseeding is important. When overseeding, use a blend of fescues, which grow deep roots and are very drought tolerant.

6. Spray compost tea on your lawn once a month during the growing season. You can make your own (see page 7) or you can buy liquid or dehydrated compost tea at many nurseries.



Greenscapes Resources for the Do-It-Yourselfer

Visit our website regularly

Our website is a treasure trove of useful gardening information, how-to's and resources. Find us at www.greenscapes.org

Sign up for our free email newsletter

Get timely tips and seasonal how-to's, sent to you primarily during the growing season. To subscribe, visit www.greenscapes.org (We will not use your email for any other purpose nor share it with others).

Other great resources for landscaping information:

nofamass.org/ - NOFA/Mass trains and certifies landscape professionals and gardeners about organic techniques

masshort.org - Mass Horticultural Society's free "Hort Line" 617-933-4929

massmastergardeners.org - Western MA Master Gardener's Association

extension.umass.edu - UMass Cooperative Extension - Fact sheets, lists of plants

umass.edu/soiltest - Soil testing and analysis

ecolandscaping.org - Ecological Landscaping Association - Organization of professionals and gardeners using natural methods

landscapeforlife.org/soil/3b.php - Landscape For Life

bringingnaturehome.net/native-gardening/gardening-for-life - Bringing Nature Home by University of Delaware professor Doug Tallamy

newfs.org/grow - New England Wildflower Society

mass.gov/dfwelc/dfw/nhesp/nhesp.htm - protects native biological diversity

rhodora.org - New England Botanical Club (NEBC) promotes the study of flora of New England and adjacent areas

nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx - National Wildlife Federation habitat at home

Mowing - the key to healthy grass...



Mowing is much more than firing up your four year-old lawn mower, cutting the grass with a rarely-sharpened blade, and collecting the grass clippings for disposal - which is what the majority of us do. We need to rethink how we mow, because proper mowing techniques are truly the primary key to a healthy, lush lawn.

Mow with a sharp mower blade

Mowing with a dull blade rips the blades of grass. Grass that is torn or frayed is weakened and can easily succumb to bacteria and disease, whereas grass that is cleanly cut seals the blades, making them much more resistant to damage. If you look closely, you can actually see the damage inflicted on your grass from a dull blade.

A rule of thumb - Mower blades should be sharpened after every 10 hours of use!

Keep your grass 3 inches tall

Taller grass not only has deeper, healthier roots, it also effectively crowds out weeds. Taller grass also helps your soil retain moisture, so watering is required even less frequently.

Mow often enough that you don't have to remove more than 1/3 of the grass height at one time

Cutting more than 1/3 of the grass blade at a time can shock your lawn and weaken its

resistance to drought, weeds and disease. If the height of your lawn gets very long, cut it down to the proper height in stages, no more than 1/3 of the total height at a time.

Use a mulching mower and leave grass clippings on the lawn

Mulching mowers create fine grass clippings that easily break down, adding nitrogen and organic matter to your soil. Composed of 85% water, they decompose quickly and will not smother your lawn.

Tip - Leaving grass clippings on your lawn is equivalent to adding one fertilizer application per season (plus they will help you avoid thatch which is an indicator of too much fertilizer).

Mow when your lawn is dry

If grass blades are wet, mowing can rip and tear the blades, leaving them susceptible to fungus and disease. Mowing wet grass can also compact the soil and create ruts.

Tip - Overseeding should be done annually because mowing removes the grass seed heads before they are allowed to form.

Fescue to the Rescue... Lawns of fescue require less care and water!

The majority of lawns in Massachusetts are composed of bluegrass (90% of commercial "sod" is comprised of this species). Not native to our area, bluegrass requires lots of water to stay healthy. Bluegrass naturally turns brown and goes dormant when it doesn't get lots of water, which is typically every summer. When this happens, many property owners spend countless hours and dollars hopelessly trying to fix the problem with water and chemicals.

A better grass alternative - fescues

In Massachusetts, lawns comprised of mostly "fescue" grasses (chewing, hard, creeping red and sheep) are drought-tolerant, pest resistant and will survive in both sunny and shady areas. Fescues are native grass types that require less water and fertilizer and have a great added benefit - they require less mowing, because they are slow growing.

Make the switch to fescues

Transitioning from a bluegrass lawn to fescues is easy. You can just overseed (preferably in the fall) by using a mechanical spreader to evenly scatter seeds over your existing lawn. It is a good idea to mow your lawn as short as possible before overseeding, so the slow-growing fescue can compete with the existing grasses.

If you have more weeds than grass, it may be better to clear everything out and re-seed in the early fall. Reseeding will also give you the opportunity to add nutrient-rich topsoil to a depth of at least six inches, so your new lawn can grow deep, strong roots.

Several manufacturers now carry fescue grass mixes - compare labels and buy the blend with the highest percent purity and germination ratings. A good choice is a seed mix that contains perennial rye and tall and fine fescues, with only a small percentage of Kentucky bluegrass. Also look for seed mixes that include beneficial fungi known as endophytes, which naturally helps control leaf-feeding insects such as sod web worms and chinch bugs.

Pesticide and Herbicide Alternatives...

Prevent your lawn from becoming a "drug addict"

Insecticides, herbicides and fungicides are not required for successful landscape care. These pesticides are toxic substances that may pose a health risk to your family, pets and wildlife if they are overused or carelessly applied. Pesticides can disrupt the ecological balance of a landscape by killing the microbial life, earthworms, beneficial insects and birds that keep "bad" insects in check. The good news is pesticides are not necessary for a beautiful, low maintenance landscape. So why take the chance if you don't have to?

If you look closely at even the healthiest landscapes, you will see a complex blend of plants and insects. Finding a few weeds or insects in your lawn is not cause for alarm. Don't be tempted to rely on pesticides as a quick-fix solution to landscape problems – most insect and weed problems are signs that your landscape is not getting what it needs.

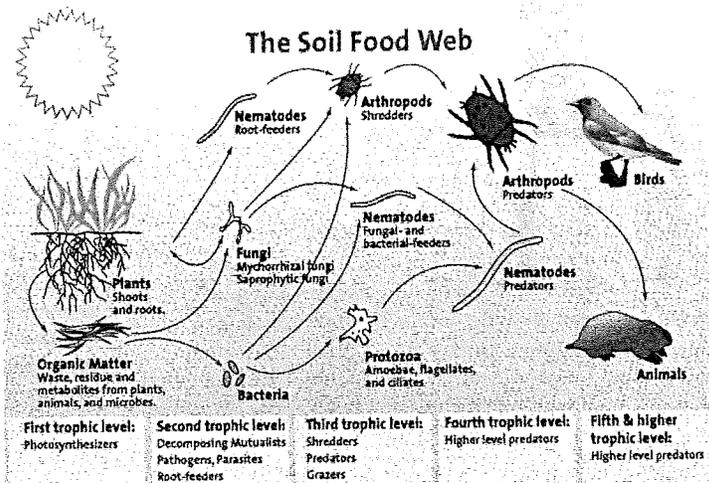
Reconsider your definition of "weed"

Although advertisements will try to convince you they are "weeds", plants such as clover and dandelions can be attractive and useful additions to a lawn. They add color and texture and even provide lawns with nutrients. Regular mowing will keep these plants from taking over your lawn and make them less attractive to bees.

Routine chemicals aren't necessary

If you have been using a chemical program in the past (either do-it-yourself or lawn

treatment service), you can stop and still have a beautiful lawn. You may initially experience an increase in weeds although this will change as the healthy grass crowds them out. A successful transition to an organic lawn will take some initial work.



If you have a few weeds, eliminate them before they spread

Use the "ounce of prevention" approach to weeds – if you stop ten from developing, you won't have a million to deal with. Look for weed seedlings every time you mow and persistently eliminate them before they get a foothold. Pull them out by hand using a weed fork, making sure to remove the whole plant and the long taproot. To treat recurring weeds in walkways or between stones, use full-strength vinegar in a spray bottle.

Prevent weed germination organically

Corn gluten meal can help prevent weed seeds, particularly crabgrass, from germinating. Corn gluten is a natural by-product of the wet milling process of corn. Follow the directions on the bag and apply

to trouble areas in the early spring before the forsythia blooms (do not apply at the same time as grass seed). Corn gluten contains 10% nitrogen, so be careful to avoid over-fertilization. Corn gluten may require up to three years of application to achieve maximum effectiveness.

Encourage natural predators

Put up bird feeders and bat houses to attract natural predators of insects. Birds and bats in your yard will consume insects by the thousands. Attracting birds and bats will not increase the likelihood of them moving into your attic or wall spaces.

If insect problems persist, seek professional help

Before spending money on insecticides, first improve your maintenance techniques by following the recommendations in this Guide. If you still suspect

an insect problem, seek advice from a respected garden center or landscape specialist and follow their instructions for selecting insecticides for a specific pest (not a broadcast control that could kill beneficial insects). Ask about organic controls such as insecticidal soaps, beneficial nematodes, and/or milky spore powder.

Dispose of unused pesticides wisely

Pesticides are considered "household hazardous waste"; they are toxic and can pollute water resources. It is illegal to dispose of unwanted pesticides with the trash, so you must take them to a Household Hazardous Waste collection event. Call your Town Hall or visit www.Earth911.org to find when your town's event is scheduled.

Some Beneficial Insects



Green Lacewing larvae voraciously eat insect pest eggs and larvae, including aphids, red mites, thrips, whitefly, leafhoppers, and mealybugs. Larvae eat for 2-3 weeks, spin a cocoon, and 10-14 days later, emerge as adults (which eat only nectar and pollen).

Frank Pearls, Colorado State, Bugwood.org



Lady beetle larvae look like tiny, colorful alligators and eat aphids, scale insects, thrips, mealybugs, and mites – all the pests gardeners despise. Both the adults and the larvae feed on pests.

Clemson U. - USDA Cooperative Extension, Bugwood.org



Damsel bugs are tan to reddish brown, slender (1/2-inch long). Able to grab prey with their thick front legs, their beak pierces aphids, caterpillars, and other soft-bodied insects. During their pre-winged (nymph) stage, they feast on insects and their eggs.

Joseph Berger, Bugwood.org

Fertilizer Alternatives...

Let nature provide the nutrients

Fertilizers contain nitrogen, phosphorous, potassium, and other elements that help build strong roots and plants. But as the saying goes, too much of a good thing can be bad.

Many of us unknowingly waste time and money by putting too much of the wrong kind of fertilizer on our landscapes, often at the wrong times. This is partially because our soil is not properly balanced (that is, it's too acidic or alkaline) to allow plants to absorb the nutrients they need in the first place. Not only do your lawn and wallet suffer, the environment does as well.

Generally speaking, lawns need much less fertilizer than is advertised. Fertilizers that are not immediately absorbed by plants pollute our water through stormwater runoff. These nutrients can contaminate our drinking water and cause rapid algal growth in ponds and bays. Algal blooms make swimming and



boating unpleasant, block sunlight, deplete oxygen and kill fish and other animals.

TIP - Save time and money by following these helpful guidelines to provide lawns with the nutrients they need to be healthy, beautiful and easy to maintain.

Have your soil professionally tested

The foundation of a Greenscapes lawn is balanced soil that is nutrient-rich. If your soil isn't healthy, your lawn and other plants aren't healthy. Find out your soil's pH and other characteristics by sending a sample to the soil lab at the University of Massachusetts (call 413-545-2311 or visit www.umass.edu/plsoils/soiltest for instructions). For a small fee, you will receive an analysis and recommendations for improving your soil. Some local nurseries also provide soil sample analyses.

Add lime if your soil is acidic

The soil pH of a healthy lawn should be between 6.0 and 7.0. Some landowners may find that their soil's pH is below 7, which means it is acidic. Acidic soil is more hospitable to weeds than grass because it prevents nutrient absorption. Adding lime will remedy this problem.

Top dress with compost

If a soil analysis shows that your lawn needs nutrients, a thin layer of compost (1/2" or less) will add organic materials that help the soil retain moisture. High-quality compost is available in nurseries by the bag or in bulk, or you can make your own. The best time to treat your lawn with compost is in the spring. You will need about one cubic yard of compost per 1,500 to 2,000 square feet of lawn area. *For more about composting, see page 7.*

Clover is a free source of nutrients

Dutch white clover is a beautiful low-growing, broadleaf species that used to be a welcome addition to many lawns. This hardy perennial smothers weeds, prevents erosion, retains moisture and naturally "fixes" nitrogen in your soil. Clover is tough enough to withstand foot traffic and offers beautiful dark green foliage and small white flowers. If bees are a concern to your family, control the blooms with frequent mowing.



Clover adds nitrogen to your soil.

If necessary, use organic fertilizers

If you follow the guidelines on this page, chances are your lawn already gets enough nutrients. However, if your soil test shows that you still need more nutrients, choose an organic fertilizer that will supplement your soil as well as "feed" your plants. Be sure to: (1) use an organic, slow release, water-insoluble fertilizer at the recommended dose; (2) don't spread the fertilizer if heavy rain is predicted; (3) evenly distribute the fertilizer using a mechanical spreader at the lowest setting, going over the area two or three times; and (4) sweep up fertilizer that accidentally lands on paved surfaces.

Fertilize in the fall, if at all

Fertilizing in the fall helps grass plants build deep, strong roots instead of a quick growth of grass blades.

TIP - Fertilizing in the spring results in more weeds and more mowing.

Organic fertilizers and synthetic fertilizers are not the same

Synthetic fertilizers are more concentrated, which makes it easier to over fertilize, burning the plant and potentially harming soil organisms. Synthetic fertilizers are more water-soluble, which means they leach out of the soil faster, polluting our water resources. Because organic fertilizers release nutrients more slowly, organic fertilizers are more effective and don't contribute as much to water pollution.

Composting...

Compost – “Black Gold”

The best way to raise healthy plants is to have healthy soil. The best way to have healthy soil is to enrich it with compost. Sometimes called black gold, you can't find a better soil amendment than compost. It improves soil structure and texture – loosening compacted and clay soils; it improves the soil's ability to retain moisture and air; it adds important minerals and nutrients; and it stimulates healthy root development. Plants love compost!

Homemade Humus—Nature's Free Fertilizer

Composting is nature's way of converting organic material into humus. Compost is made when kitchen scraps, leaves, grass clippings, etc. decompose. Critters such as micro-organisms (bacteria, fungi and molds) along with earthworms and insects, convert the plant material into humus. The process of composting is simply a matter of providing these organisms with food, water and oxygen and letting them do the work.

Composting is Easy

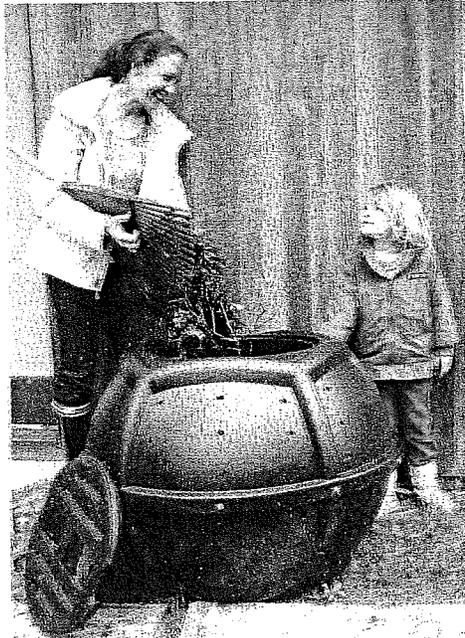
Step One: Start with a bin

You can make your own compost bin by using inexpensive wire mesh or even a trash can with a lid and holes drilled into the bottom. Many towns offer rodent-proof bins at a reduced price (contact your Town Hall), or attractive bins can be purchased online and through many garden centers.

Tip - An average household can compost between 500 and 1,000 pounds of organic material each year in one of these bins, producing a rich soil supplement out of material that would otherwise be thrown away.

Step Two: Collect compostable materials

For balanced compost you will need both “brown” and “green” materials. “Brown” materials are high in carbon (but not necessarily brown in color). Brown materials include dried leaves, paper and woody-type materials. Not necessarily green in color, “green” materials are moister and high in



nitrogen. They include kitchen scraps, grass clippings and coffee grounds.

Tip - To optimize the composting process, use approximately three parts “brown” to one part “green” material.

Step Three: Add the materials and add water

Start by putting a shovel full of dirt into your bin. This serves as a “starter” – introducing the desired microorganisms into the compost. Then add alternating layers of brown and green materials, trying to follow the 3 browns to 1 green ratio.

Add water when you start so that your pile is damp, like a wrung out sponge but not wet. This is critical – only damp materials will decompose. Add water whenever it feels dry.

Step Four: Keep the pile aerated

Compost critters need oxygen to do their work. Every time you add material to your pile, fluff and turnover the pile with a hoe or pitchfork. More aeration makes faster compost.

Step Five: Mix your finished compost into the soil

It will generally take from six months to a year to make compost. Finished compost is dark in color and looks like rich, brown soil. For most

garden applications, it's fine to use compost that still has some recognizable bits of leaves or twigs – they'll finish decomposing in the soil.

To use, mix one-half to three inches of finished compost into the top four inches of soil about one month before planting. Compost can be applied as a top dressing in the garden throughout the summer



Many towns offer discounted compost bins. Contact your Town Hall or visit www.mass.gov/dep/recycle/reduce/compngnt.htm

Compost tea – Nature's perfect plant food

High quality compost is also available in easy to use, liquid form called “compost tea”. This nutrient rich brew is made by steeping compost in oxygenated water which activates the beneficial micro-organisms in the compost a million-fold.

Compost tea is pH neutral, so you can water with it and never worry about burning your plants. When sprayed on plant leaves, compost tea helps fight disease as well as feed the plant.

Visit Greenscapes.org for step-by-step directions on how to turn your compost into compost tea.

Watering...

True or False: Is it possible to overwater your lawn?

If you said true, you are correct. Lawns can be overwatered. Too much water weakens the grass, makes it more susceptible to disease and causes "shallow root syndrome."

Follow these guidelines to train your lawn to be more drought-tolerant, ultimately saving you both time and money.

Let your lawn tell you when it's thirsty

Watering needs can't be determined by a clock or calendar, but by a combination of factors including grass type, soil type, drainage and exposure to sun and shade. Do the Walk Test to determine when your lawn needs water.

The Walk Test

Does your grass stand up straight after being walked on? If not, your lawn is thirsty. Walk across your lawn and look back. If you can still see your footprints after a few minutes, your grass needs water.



inch of water per week (set out tuna cans or plastic containers with 1" marked off while you're watering). Let the lawn dry out before watering again – infrequent watering with a good soak is best.

Water your lawn at dawn (or as close to dawn as you can)

Watering at daybreak is about 10 times more effective and it helps prevent the growth of fungus.

Conserving Water

Our communities require adequate supplies of water for human consumption and fire protection. Landscape irrigation uses a huge amount of water, much of which is wasted due to evaporation, runoff or overwatering. Here are some tips that will help conserve water supplies.

Water plants, not pavement

Nothing is more wasteful than a sprinkler that waters the street or sidewalk. Adjust the water pressure on your sprinkler so the spray doesn't overshoot the lawn. For difficult to reach areas, use a sprinkler head with adjustable nozzles. For automatic systems, make sure sprinkler heads are at least 8" from paved areas. Avoid sprinklers that produce a fine mist that easily evaporates and blows off target.

Water only between Memorial Day and Labor Day

In Massachusetts, established lawns usually only need watering during the months of June, July and August. Spring and autumn usually have increased rainfall and cooler temperatures.

Check the weather forecast

Don't water if rain is predicted. And turn the sprinklers off if it starts to rain! Install a rain sensor on your automatic irrigation system to prevent unnecessary watering.

Abide by local watering restrictions, even if you have a private well

People are more important than lawns. If your town has implemented a watering ban, be sure to comply with the regulations. (Private wells and municipal wells often draw from the same groundwater sources.)

Tip - Typically water use by the public doubles in the summer from the amount used in the winter. This is why towns implement "watering bans" to restrict outdoor water use.

Water deeply but infrequently to prevent "shallow root syndrome"

Deep watering encourages strong, deep roots, which helps the lawn withstand drought and disease. Healthy lawns generally need only one

How much water do you use? 65 gallons per person a day?

How much water do you use? To protect public health and safety, as well as our natural resources, the MA Executive Office of Environmental Affairs recommends a maximum water use of 65 gallons per person per day.

How does your household measure up? You might be surprised!

Gather your recent water bills to see if your family can stay below the recommended maximum water use of 65 gallons per person per day goal.* Summer water bills will be a true measure, because water use typically doubles due to lawn irrigation.

Watering one inch of water on a one acre yard consumes 26,000 gallons - more than a standard 16' X 32' swimming pool.

* Massachusetts Dept. of Environmental Protection

_____	/	_____	/	_____	=	_____
Total gallons consumed in billing cycle		Days in billing cycle		# of people in household		GALLONS PER PERSON PER DAY

GOAL
< 65 gallons
per person/day

NOTE: If your water bill is in cubic feet (CF), multiply your consumption in cubic feet by 7.48 to convert to gallons, and then make the same calculation above. If your consumption is in hundreds of cubic feet (CCF), then multiply by 748 and follow the calculation.

TIP: Cut down on your water consumption by watering your lawn at dawn & only when necessary as determined by the Walk Test -
 To learn more go to Greenscapes.org



Water Irrigation Systems...

They don't have brains, only clocks

A clock has no way of knowing when your lawn is thirsty, so when left on "automatic," irrigation systems can waste large quantities of water and harm your lawn. Follow these tips to irrigate responsibly.

The best setting for an automatic irrigation system is "off"

You can program your system to run at dawn, but keep it turned off until you need it. Monitor your lawn and the weather, and then decide when it needs irrigation. You can set your system the night before to turn on at dawn, but remember to turn it off again the next morning!



Use "Smart" Controllers

Weather-based (or "smart") controllers can reduce water use by 15%. These controllers apply the correct amount of water needed by continuously monitoring conditions such as soil moisture, rain, wind, slope, and temperature.

Move your system controller to a convenient location

Is your controller hidden in a corner of the basement? It's easy and inexpensive to move the controller to a prominent place, which will make your system easy to use responsibly.

Consider upgrading to underground drip irrigation

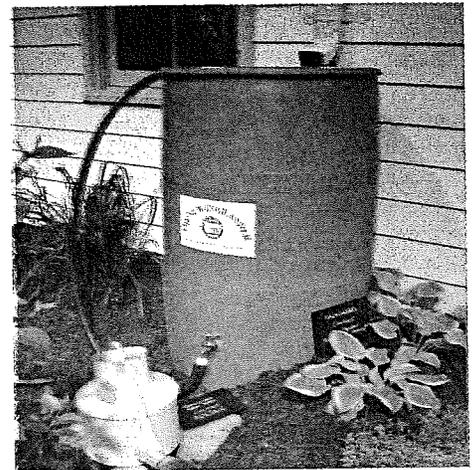
Drip irrigation is the best way to go. Water goes directly to the roots, causing less disease and fewer weeds and it uses about 25-30% less water than above-ground sprinklers.

Keep your system maintained and checked every 2-3 years

Much can happen during a two-year period to make your system work inefficiently. Proper maintenance can increase the life of your system's components and save water. Use sprinkler heads with built in pressure regulators to keep your system balanced.

Only use trained and certified technicians to design and maintain your system

The "one size fits all" approach does not work. Proper system design and maintenance takes into account the needs of your landscape and site conditions of your yard.



Harvest rainwater with rain barrels or cisterns

The average roof will shed over 5,000 gallons of water during the summer months! Rain barrels and cisterns collect clean rainwater from your roof so you can stockpile it when it's plentiful and use it later during a drought. One quarter inch of rain on a one-car garage will fill a 55-gallon rain barrel. Rain barrels are great for watering small areas by hand, and larger cisterns can even be connected to an automatic irrigation system. The MA Dept. of Environmental Protection website www.mass.gov/dep/water/resources/rainbarl.htm has a list of rain barrel manufacturers, many of which offer discounts.

Lawn Watering Math

Watering 1 inch of water on a 1-acre yard consumes 26,000 gallons - more than a standard 16' X 32' swimming pool. If you water one inch a week from May to September, you are putting the equivalent of 20 swimming pools of water on your lawn - over half a million gallons!

For more information about maintaining your automatic irrigation system or finding a certified irrigation contractor, see www.irrigation.org

Planting Beds...

Want to eliminate lawn problems altogether?

Plant something instead of grass!

Beautiful yards don't need expansive lawns covering the entire property to be attractive. Replacing part of your lawn with low maintenance ground covers, planting beds, gardens, patios and walkways will add color and dimension to your landscape, while increasing your property value. An added benefit - almost any plant is easier to maintain than grass.

By minimizing your lawn, you're going to save time and money.

Create a design plan

You can do this yourself or with help from garden design software, garden centers, or a designer. Gardening websites offer a plethora of information.

Your design should take into account the sunlight throughout the day, existing vegetation, topography and intended uses of the property. Plan your work in phases to suit your resources.

Choose the right plants

This is truly the key to success. Plants have evolved to live in certain conditions. Trying to make a shade-loving plant grow in a spot that gets four hours of direct sunlight makes for an unhappy plant. Select low-maintenance,



Drought tolerant rock garden

Photo by Stephanie Stathic of Dutch Designs LLC of North Andover

drought-tolerant shrubs, trees, perennials, and groundcovers. When selecting plants, be aware of prevailing conditions in various areas of your yard (hot/sunny, cool/shady, moist/dry) and take into consideration the plants' light, water and soil (pH) requirements. Avoid invasive species or high-maintenance plants that need lots of chemicals and water to survive.

Make it native!

Make a point of selecting native plants for your gardens because they have adapted and survived in our environment over centuries. Most native plants also provide some important function for birds and other wildlife, such as being a food source or shelter. One of the best sources for native plants is American Beauties, www.abnativeplants.com. You can find American Beauties plants in many local nurseries.

Avoid Invasive Plants

Did you know that some New England favorites, such as Burning Bush, English Ivy, Oriental Bittersweet, and even some types of maples, are invasive?

An invasive plant thrives and spreads aggressively outside its natural range or far beyond where you plant it. Many invasive plants continue to be admired by gardeners. As of January 2006, the MA Department of Agricultural Resources banned the sale of 137 invasive plants, because they threaten the diversity of our natural landscapes. Please be part of the solution. Learn about plants before you buy them. Go to Greenscapes.org for more information on invasive plants in Massachusetts.

Cluster plants for easy care

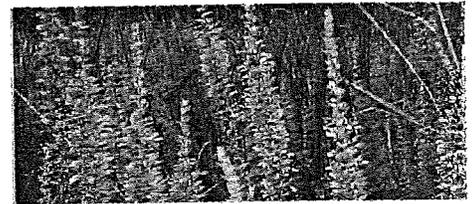
Grouping plants close together minimizes weeds. Clustering plants with similar care requirements will save you time and limit watering needs.

Use mulch and ground covers

Mulch and ground covers can be your best friend, particularly in the areas under trees and bushes where grass won't grow, but weeds will. Mulch is very beneficial to plants and soil because it helps retain water, minimize evaporation, inhibit weed growth, moderate soil temperature, and prevent erosion.

Organic mulches increase soil organic matter and microbial biomass and activity. Bark mulch and nutshells will take several years to break down, while pine needles decompose quickly and make the soil more acidic. Straw, shredded leaves and composted yard waste will decompose within a year but will significantly increase nutrient availability and plant growth, because they support those important microbes.

Mulches should be about 3 inches deep but optimum depth depends on soil type. Sandy soil, which loses moisture rapidly, benefits from a thicker mulch than clay soil, which retains water. Before mulching, pull weeds or smother them with a layer of newspaper, then water well. To avoid diseases, pull the mulch back an inch or two from your plants and **never mound mulch up around tree trunks.**



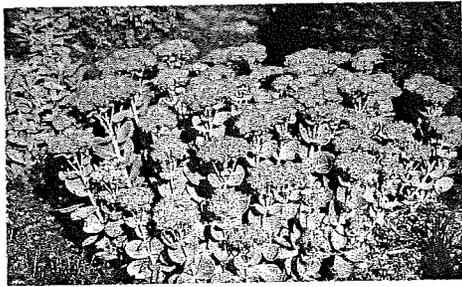
A Tale of an Invasive Plant

Purple loosestrife (*Lythrum salicaria*) has been prized for its tall pinkish-purple flower spikes. Gardeners unknowingly purchased this perennial from nurseries, but soon its fine seeds easily washed into waterways and were blown by the wind or carried to new areas by birds. Stands of loosestrife spread exponentially in wetlands and along streambeds, displacing native wetland plants.

Low Maintenance Plants...

The plants listed below are a small sample of beautiful plants that are drought-tolerant and require little maintenance once established. Many are native to New England (noted with an asterisk *). For more plant suggestions, visit our website Greenscapes.org.

Perennials



Sedum Autumn Joy (*Sedum* × '*Autumn Joy*')

A well-known favorite that attracts butterflies and moths. Flower heads form in mid-summer and turn from pink to dusty-rose as the summer progresses, becoming dusty-red in the fall. Leave flowers on for winter interest.



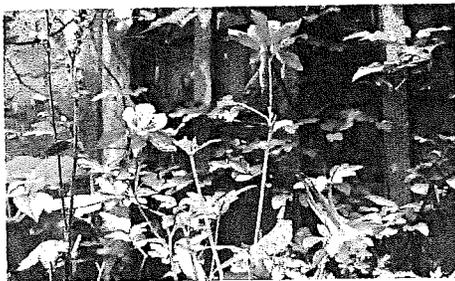
Blanket Flower (*Gaillardia aristata*)*

These 12 - 16" tall bright yellow daisy-like flowers with burgundy-to-plum colored centers will bring vibrant color to sunny borders and butterfly gardens. Vigorous, easy to grow, and salt tolerant. Begins blooming in late June and continues into fall.



Pearly-everlasting (*Anaphalis margaritacea*)*

Individual, erect stems 1 - 3' tall. Flowers long-enduring, white, dry bracts arranged around a yellow center. Gray-green to woolly-white leaves. Plant in clumps to create a bushy appearance. Attracts American and Painted Lady butterflies.



Eastern Red Columbine

(*Aquilegia Canadensis*)* 2' tall, erect, branching perennial; showy nodding, red and yellow flowers. Can propagate for years and self seed. A woodland flower, it likes shade to part shade and well-drained but not too rich soils. Attracts hummingbirds.



Moonbeam Coreopsis

(*Coreopsis verticillata*)* Clusters of light yellow, daisy-like blooms with green airy fern-like foliage. Blooms from June through October and is mildew resistant. Stands 24" tall and spreads 18 - 24" wide. Perennial of the Year in 1992.



Liatris (*Liatris species*)*

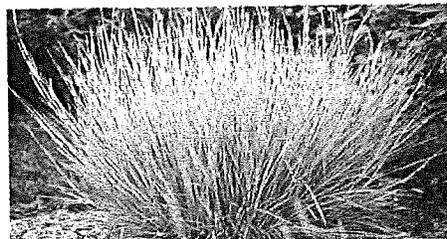
A robust and striking perennial also known as Blazing Star and Gayfeather. This attractive plant has an interesting vertical spike of purplish-pink or white flowers. Excellent flower for cutting and drying. Attracts butterflies and hummingbirds.

Ornamental Grasses



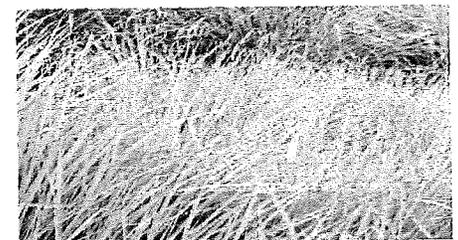
Feather Reed Grass (*Calamagrostis* × *acutiflora*

Karl Foerster) A medium sized grass with upright foliage, very carefree and versatile. Buff-colored plumes bloom early (June-July), Perennial Plant of 2001.



Little Bluestem (*Schizachyrium scoparium*)*

Clump forming grass growing from 2 - 4' tall. Summer color is green to blue green, with pinkish-tan fall color. Best in full sun and poor soils for massing or as a groundcover.



Big Bluestem (*Andropogon gerardii*)*

An appealing choice to create a screen or hedge. The ½" wide blue-green blades are topped by purplish-bronze pods in the fall. With maturity, it grows to a graceful 6'.

Shrubs



Winterberry (*Ilex verticillata*)* Small rounded shrub with 3 - 4" light green leaves turning yellowish-red in autumn. Striking pinkish fruit with vivid orange seeds. Needs male plant nearby for the female plant to bear fruit. Tolerant of drought and different soil types.



Virginia Sweetspire (*Itea virginica*)* Deciduous 3 - 5' shrub with fragrant, white flowers in June-July and purplish red fall foliage. Grows in sun or shade. Good alternative to Burning Bush (*Euonymus alata*).



Northern Bayberry (*Myrica pensylvanica*)* Hardy 5 - 10' shrub with lustrous gray-green leaves. Tolerates full sun to part shade, wind, poor soil and salt spray! Needs at least one male plant for pollination for fruit to set. Grayish-white berries in winter attract birds.

Trees

Eastern Red Cedar (*Juniperus virginiana*)* Handsome native evergreen with light blue berries that attract wildlife. Excellent as a specimen and useful in masses for windbreaks and screening. Also salt tolerant.



Pin Oak (*Quercus palustris*)* Large 50 - 70' fast growing tree. Strongly pyramidal with central leader and a good shade tree. Fall color is red-to-burgundy.



River Birch (*Betula nigra*)* Not susceptible to birch borer or miners that plague many birch. This 40 - 70' native tree has the characteristic exfoliating bark that is enhanced by a range of hues.



Groundcovers



Lowbush Blueberry (*Vaccinium angustifolium*)* Low spreading deciduous shrub growing to 8 - 12" tall. Glossy blue-green leaves in summer, turning purple in fall. Flowers are white, bell-shaped turning to a small sweet dark blue berry. Grows best in wooded or open areas with well-drained acidic soils.



Bearberry (*Arctostaphylos uva ursi*)* Creeping native groundcover that grows 6 - 12" tall, with glossy evergreen foliage that forms broad mats up to 15' wide. Red berries in July and August. This slow growing shrub provides food for wildlife.



Barren Strawberry (*Waldsteinia fragarioides*)* An ornamental, strawberry-like plant that may be used in a variety of landscape situations, including slopes. Drought tolerant. Foliage is evergreen but will turn brown-bronze in cold winters.

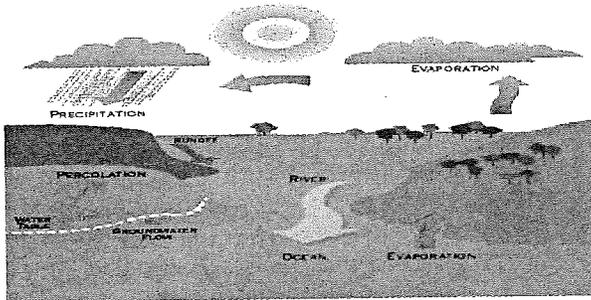
Make rain an asset...

Reduce and reuse rain water runoff

Managing Stormwater

We all need clean water to drink. We also want to have plentiful, clean water in our ponds, rivers and bays so we can enjoy activities such as swimming, boating, fishing, and nature watching. But what does that have to do with how we design and maintain our landscapes?

NATURAL WATER CYCLE



In an unaltered forested landscape, 99% of rainfall seeps (recharges) into the ground.

However, as we build communities to support our growing population, the natural hydrologic cycle is altered as forestland is replaced with

MAN-MADE WATER CYCLE

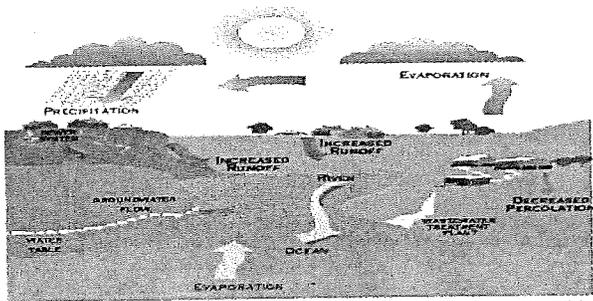


Image provided by Charles River Watershed Association

hard (impervious) surfaces such as roads, roofs, driveways, and lawns. Today stormwater runs right off these impervious surfaces, carrying pollutants, trash and bacteria directly into storm drains that discharge into our lakes,

www.greenscapes.org

ponds and rivers without any treatment.

Not only is rainwater running off impervious surfaces very dirty, it also travels in a much greater volume than when land was undeveloped and could absorb water. Runoff causes flooding, erosion, water pollution, and worse - groundwater is not recharged in our aquifers.

Suburban lawns treated with synthetic fertilizers, herbicides and pesticides contribute to these problems by destroying the microbial life needed to keep the soils porous; consequently soils become severely compacted.

FACT: The EPA estimates that 80% of the water put on lawns runs off carrying fertilizers, herbicides and pesticides directly to our rivers, lakes, ponds and oceans!

You can manage your property so rain becomes an asset to your property instead of a problem to the environment.

Maximize natural areas

The easiest way to protect water quality and reduce the quantity of runoff is to keep part of your landscape natural. Woodlands not only absorb water and recharge groundwater; they provide precious habitat for wildlife.

Limit paved surfaces

Instead of using traditional asphalt and paving stones, consider using porous materials, such as permeable pavers, mulch, stone, or shell. There are porous versions

of asphalt and concrete that perform well and look much like the regular material. For more information, visit the **Massachusetts Low Impact Development website:** www.mass.gov/envir/lid

Redirect runoff from your roof and driveway

Most driveways and sidewalks are designed to whisk water away from your property, usually straight to the street storm drains, which flow into the nearest pond or river. You can redirect this water into the ground, by using a number of easy solutions: French drains (holes filled with gravel), vegetated depressions or a rain garden (see page 14). If redesigning or constructing a new driveway, slope it to drain onto a vegetated area rather than the street.

Create vegetated buffers along bodies of water

Planting a natural buffer of shrubs and trees along rivers, streams and ponds has huge benefits for the water body. The



buffer protects water quality by intercepting chemicals, animal waste and other pollutants and directing them into the ground where the soil can filter them out.

An ideal vegetated buffer is at least 100 feet wide and could include bushes such as winterberry, elder berry, high bush blueberry, and trees such as cottonwood, black willow, and red maple. A good garden supply store should have plenty of information about native plants for vegetated buffers.

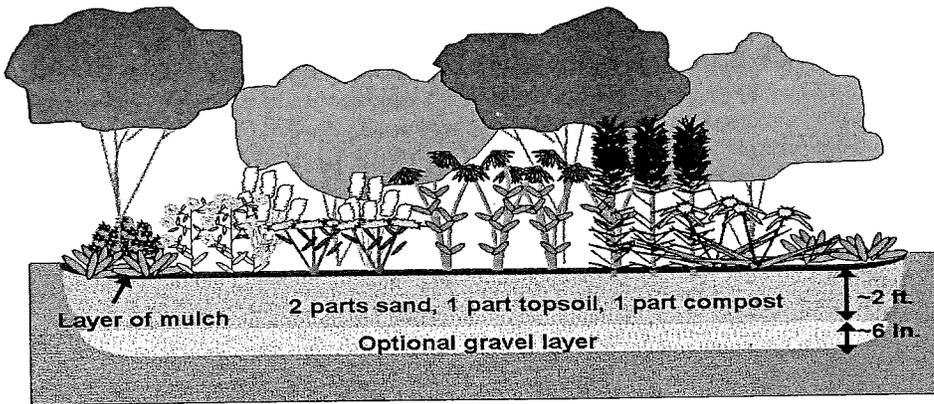
For more information, see www.crjc.org/riparianbuffers.htm

NOTE: Landscaping projects within 200 feet of a river or 100 feet of a wetland may be subject to regulation by your local Conservation Commission.

Rain Gardens

A beautiful way to clean and recycle rainwater.

A rain garden is a bowl-shaped garden designed to collect and absorb runoff from a roof or driveway. Rain gardens are constructed by filling a low-lying area with a layer of gravel, special soil blend and hearty plants.



Why should I make a rain garden?

By capturing runoff, rain gardens prevent polluted stormwater from going down the storm drain and out to our rivers, ponds and oceans. Rain gardens also help replenish our aquifers and groundwater-fed rivers and ponds by recharging rainwater into the ground rather than down the storm drains. In fact, rain gardens absorb 30% more water than the same size area of lawn!

Create your own rain garden

Follow these seven easy steps to make your very own rain garden. More detailed instructions and plans can be found at www.raingardens.org or www.raingardennetwork.com

1) Choose a location - Pick a site for your garden that tends to collect water or where runoff from your driveway or downspout can be diverted. Your rain garden should be at least 10 feet away from building foundations, underground utilities, and septic system drainfields. Keep a 1-2 foot grass or groundcover buffer between any downspouts and your garden to prevent washout.

2) Measure your garden - Your rain garden should be 20-30% of the drainage area it is treating. So, if you are treating runoff from your 1000 sq ft driveway, you want a 200-300 sq ft garden. Rain gardens are versatile – they can be any shape you want, from a regular rectangle to an amorphous blob. It should be graded slightly so water flows toward the center, about six inches lower in the center than the edges. Provide for overflow from heavy rains.

3) Check the drainage - It is important that your rain garden drains. Determine if water can infiltrate fast enough by digging a hole approximately 8 inches deep and pouring in a few inches of water. If the water drains slower than an inch an hour, you will need to add at least 6 inches of gravel to the bottom of your rain garden.

4) Prepare your soil - Soils can be improved by loosening them and mixing them with some compost. The ideal soil is a mix of two parts sand, one part topsoil (no clay), and one part compost. Loosen the soil to a depth of 2'.

5) Choose your plants - Select a variety of native, low-maintenance flowers and grasses that will provide color and interest throughout the seasons and can tolerate both wet and dry conditions (remember the rain garden will fill with rainwater periodically). Consider light and water preferences of the plants – some will thrive in sun, others shade; some prefer the drier edges of the garden, others may thrive in the soggy center. Group the plants together for the most impact, and estimate one small plant per square foot.

6) Plant your garden - Native plants should be incorporated into a rain garden because they don't require fertilizer, have good root systems and have adapted to utilize the water and nutrients available in native soils. Perennials, shrubs, wildflowers, or a mixture of all three can be planted. Minimize walking on the prepared soil to avoid compaction. Once all your plants are in their new home, give your garden a good drink of water.

7) Add mulch - A 2-3 inch layer of shredded hardwood mulch is necessary to keep the soil moist and ready to soak up rain. It also helps reduce weeds. Do not use chipped bark mulch; it tends to float when flooded.

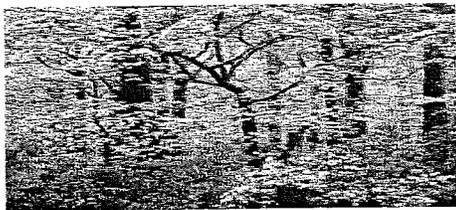
Caring for your garden

For the first two or three weeks, water plants about every other day until they are growing and doing well. After they are well-established with deep roots, they won't need additional watering. Keep the garden free of debris that might affect drainage and weeds. If parts of the garden seem to be eroding from too much flow, use stones to spread out the water as it enters the garden.

What about mosquitoes?

Mosquitoes won't find rain gardens to be good breeding areas because if a rain garden is properly constructed the water will drain within 12-48 hours. The Culex mosquito, the variety that transmits West Nile virus to humans, prefers to breed in small containers of water that remain stagnant for at least 10 days at a time.

Greenscapes Lawn Care Calendar



Early Spring (April)

- Test soil
- Add compost, lime and other soil amendments if test indicates
- Start new compost bin/pile
- Remove leaves and add to compost bin
- Rake to remove thatch buildup.
- Apply corn gluten for crabgrass control (when forsythia blooms) - do not apply at same time as seeding
- Re-seed bare patches and top dress with compost
- Sharpen mower blade if needed and reset height to 3 inches
- Leave clippings on the lawn
- No need to water in average years
- Apply compost tea



Late Spring (May-June)

- Sharpen mower blade if needed and keep height at 3 inches
- Pull weeds by hand or treat with vinegar
- Re-seed bare spots if you haven't done so
- Plant native, drought tolerant plants
- Mulch gardens
- Top dress lawn with 1/2" compost if not done already
- Apply compost tea
- Before Memorial Day, no need to water in average years
- After Memorial Day, conduct Walk Test and water if thirsty
- Aerate and water compost pile



Summer (July-August)

- Sharpen blade and reset height to 3 inches
- Leave clippings on lawn
- If grubs, treat with milky spore or beneficial nematodes
- Routinely conduct Walk Test and water if thirsty (but obey watering bans)
- Continue to pull weeds or treat with white vinegar
- Allow grass to go dormant during dry summer days
- Aerate and water compost pile



Fall (September-October)

- Best time to start or renovate lawn
- Mow at 3" high until last mowing of season - mow at 2"
- Until Labor Day, conduct Walk Test and water if thirsty (but obey watering bans)
- After Labor Day, no need to water in average years
- Apply corn gluten to control next year's crabgrass (do not apply at same time as seeding)
- Overseed with drought-tolerant grass seed (includes mostly tall fescue seeds)
- Top dress lawn with 1/2" of compost
- Aerate compacted area
- Rake leaves; use as mulch and/or add to compost pile

Building Raised Beds

Start by selecting a non-toxic material such as untreated wood, modular blocks or recycled plastic lumber. Don't use railroad ties or pressure treated boards that contain any creosote or arsenic. You can buy raised bed kits online.

When building, consider ease of access. The minimum depth for the bed should be 6 - 12", but the deeper the better for plant roots. Remember to reinforce the corners of the structure with brackets for extra structural stability.

Once the frame is built,

1. Fill with a 50-50 mixture of clean loam and compost.
2. Water thoroughly to settle the soil before planting. Soil should be about 2" below the frame top.

TIP - A raised bed is an easy place to go organic. In a raised bed, it is easy to change the soil composition. If you need more drainage, just add more sand. If a richer soil is needed, increase organic matter by adding manure or more compost.

More and more people are reclaiming paved areas for gardens. Ideally, impervious surfaces, such as asphalt or concrete, should be removed, but you can build raised beds over existing hard surfaces by drilling drainage holes in the paved surfaces.

Before the frame is built,

1. Mark off the area and make drainage holes in the paved surface using an electric jackhammer with a pointed chisel drill bit (available from a rental center) or a masonry bit and drill.
2. Drill approximately nine holes per square foot, making sure you go all the way through.

Once the frame is built,

1. Lay down a weed blocking fabric liner on the hard surface to prevent soil from clogging.
2. Secure the liner to the inside of the frame, going up the sides.
3. Add a 1-2" layer of gravel for aeration.
4. Then follow directions above.

Help Protect Our Watersheds

The source of all our water

The best way to protect our water supply and keep our ponds, lakes and rivers clean is to manage them on a watershed basis.

What is a watershed?

A watershed is a basin that drains or "sheds" into a water body (river, stream, lake, pond, swamp, wetland, estuary, coastal bay, underlying aquifer and ocean). Rainwater, including melting snow and landscape irrigation, runs downhill into these water bodies carrying pollutants it picks up on land: oil and gas, bacteria, lawn chemicals and more.

Why are watersheds important?

Everyone lives in a watershed. It's where we work and play. Each of us influences the quality of life in our watershed by how we treat the natural resources – soil, water, air, plants, and animals.

Healthy watersheds are vital for a healthy environment and economy. Our watersheds provide water for drinking, irrigation and public safety. They feed the lakes and rivers where we recreate, and they provide the food and shelter to sustain wildlife.

What can I do to keep my watershed healthy?

You can start by incorporating Greenscaping techniques into your yard care. There are other things you can do that will reap many benefits in keeping our watersheds clean and healthy: picking up after your dog (dog waste is filled with billions of bacteria), making sure your car isn't leaking any oil, (and of course never dumping oil or anything else down the storm drains), and pumping out your septic system on a regular basis.

Become a member

Your local watershed association relies on membership to be able to watch over and safeguard your watershed. Please become a member. Added benefits to membership include education, advocacy, recreational events, and the knowledge you are part of an organization protecting our water.

Greenscapes Massachusetts Coalition Partners



Eight Towns and the Great Marsh Committee (8TGM)
Merrimack Valley Planning Commission
100 Main St., Haverhill, MA 01830
978-374-0519 www.8tb.org

8TGM works with communities to foster stewardship of coastal resources on the upper North Shore by heightening awareness of solutions to pollution problems, providing technical assistance, and supporting local research and education problems.

Ipswich River Watershed Association (IRWA)

143 County Road, Ipswich, MA 01938
978-412-8200 www.ipswichriver.org

IRWA has served as the voice of the Ipswich River since 1977. Through education, outreach, monitoring, and advocacy, IRWA seeks to connect the people, communities and ecosystems integral to a healthy watershed.



IPSWICH RIVER
WATERSHED
ASSOCIATION
The Voice of the River



NSRWA

North and South Rivers Watershed Association (NSRWA)

214 South St., Norwell, MA 02061
781-659-8168 www.nsrwa.org

NSRWA is a non-profit grassroots environmental organization on the South Shore of Massachusetts. The mission of the NSRWA is education, restoration and advocacy for the North and South Rivers and the 95 square miles of river basins that feed them. The NSRWA was founded in 1970 and currently is the largest local environmental organization on the South Shore.

Pioneer Valley Planning Commission (PVPC)

60 Congress St. Fl 1, Springfield, MA 01104
413-781-6045 www.pvpc.org

PVPC has been serving Hampshire and Hampden counties of Western Massachusetts as a catalyst for regional progress since 1962. PVPC works with communities to define problems and devise solutions to areawide concerns too large for communities to resolve on their own.



Salem Sound Coastwatch (SSCW)

201 Washington St. # 9, Salem, MA 01970
978-741-7900 www.salemsound.org

SSCW works to improve and protect the environmental quality of Salem Sound and its coastal watershed. Working with North Shore communities, SSCW seeks to restore coastal habitats and improve water quality through monitoring, education and working cooperatively within communities to clean up degradation and sources of contamination.

The Greenscapes program is funded by cities and towns served by these Greenscapes Coalition Partners. Without the support of these cities and towns, this program would not be possible.

To see if your town is a member, please visit www.greenscapes.org