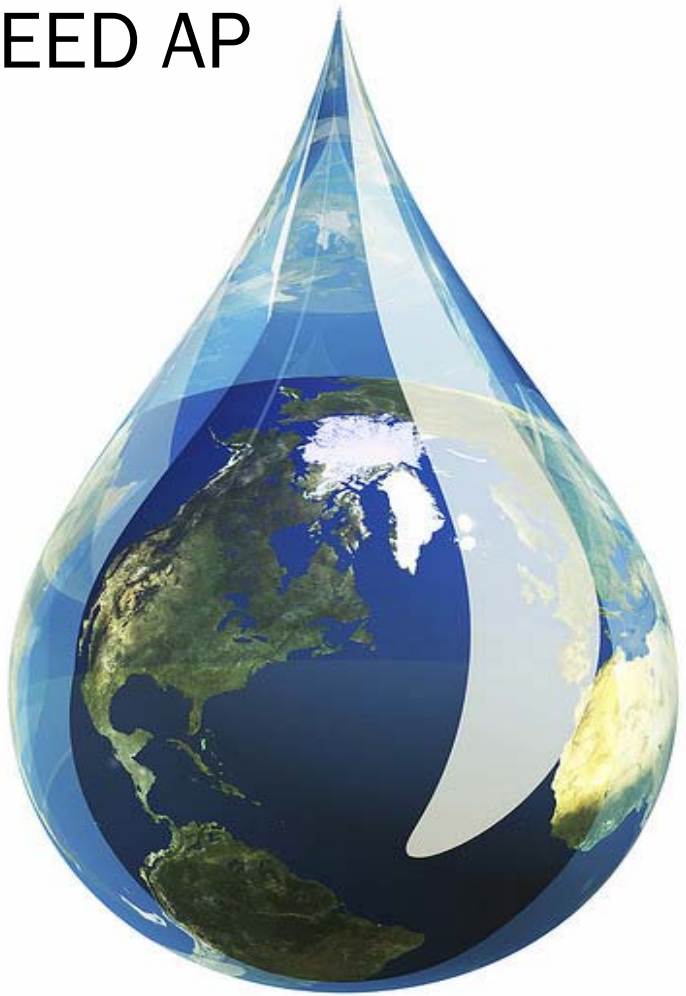
SUSTAINABLE LANDSCAPING

Christine Scypinski, RLA, LEED AP
WDG | Waterfield Design Group



Sustainable Landscaping ?

"Sustainable landscapes are responsive to the environment, re-generative, and can actively contribute to the development of healthy communities. They …

- sequester carbon,
- clean the air and water,
- increase energy efficiency,
- restore habitats, and
- create value through significant economic, social and, environmental benefits."

ASLA / SITES – Sustainable Sites Initiative

Landscape Sustainability

BIG Issues

- Global Climate Change
- Air Pollution
- Water Pollution
- Water Shortages & Drought
- Stormwater Management
- Pesticide Toxicity
- Soil Health
- Fertilizer Run-off
- Non-Renewable Resources
- Energy Usage

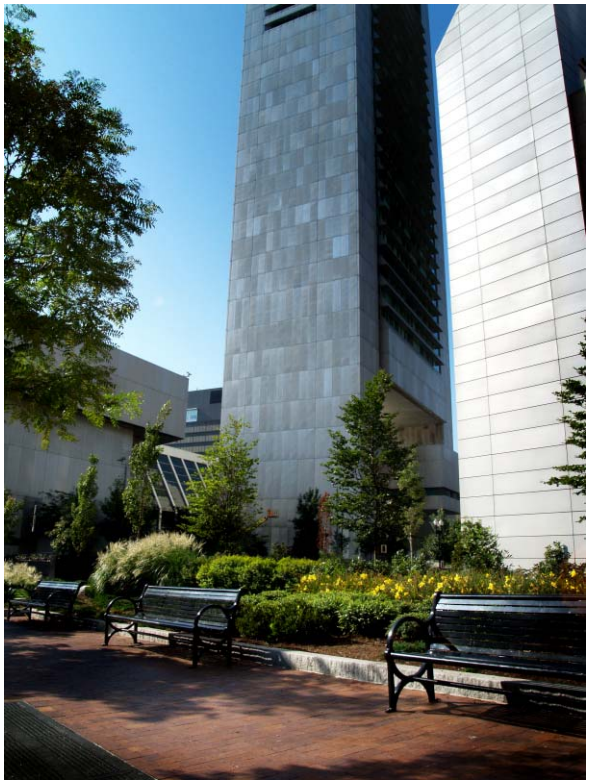
Landscape Architects

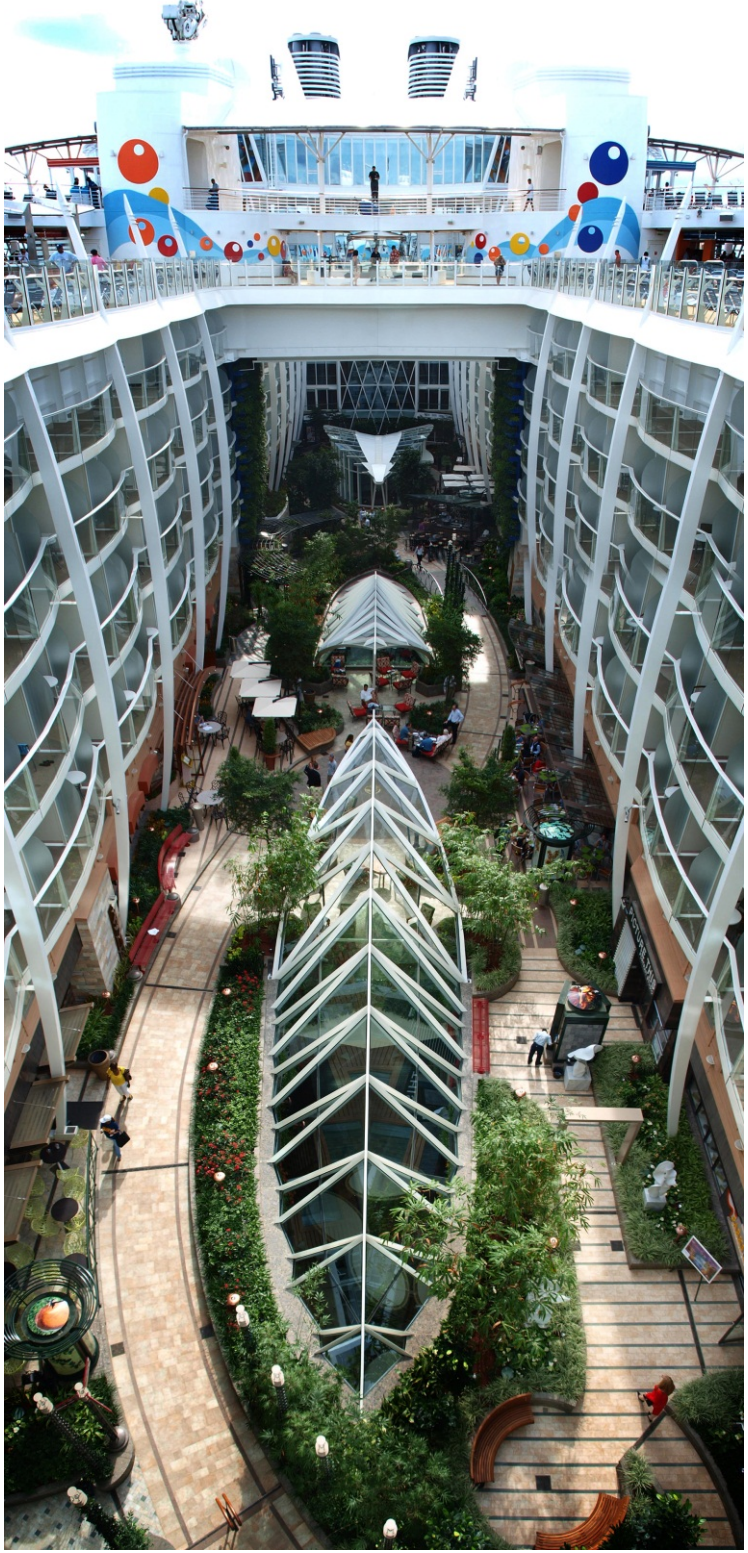
~working towards the solution~

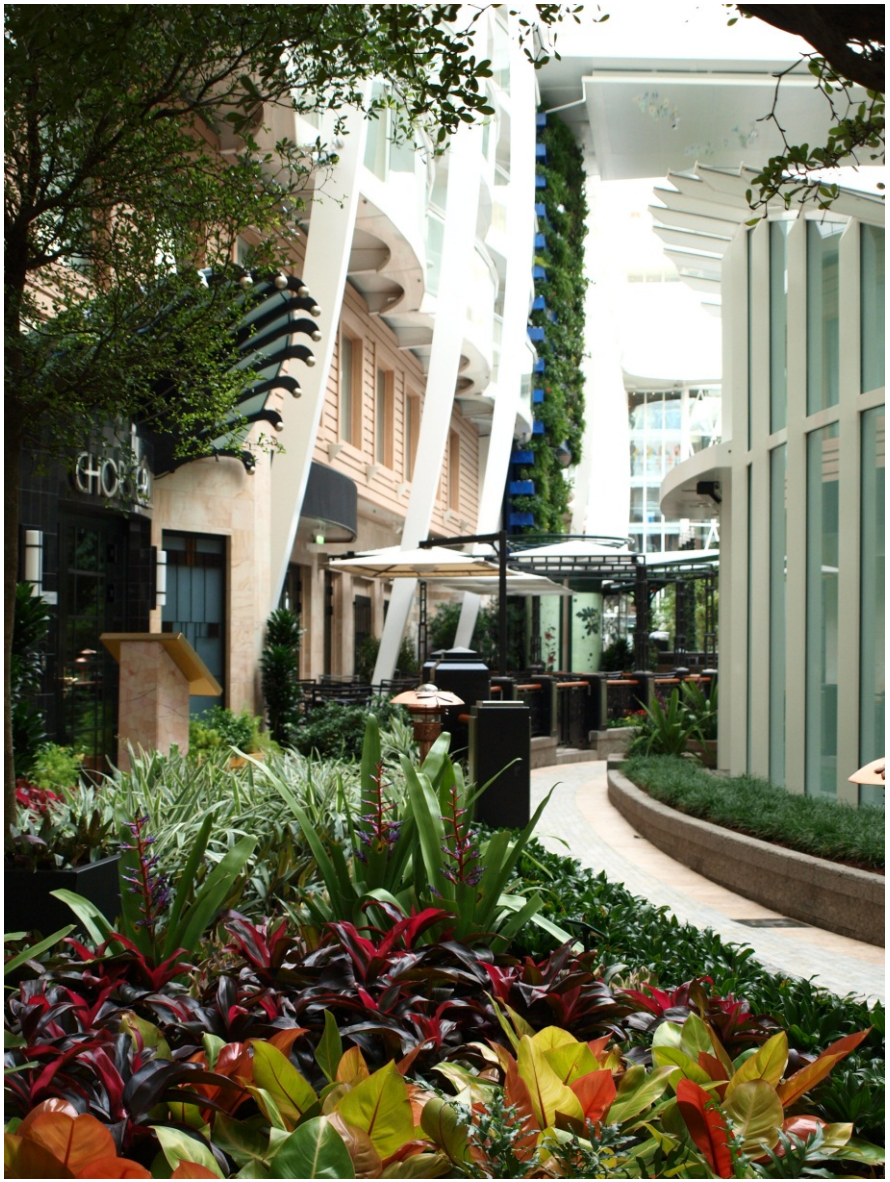
Rejuvenating and creating ~

- “green” space
- “green” streets, roofs and walls
- “green” schoolyards & outdoor classrooms
- parks and playgrounds
- commercial, office, institutional sites
- residential developments

~ places for people and wildlife





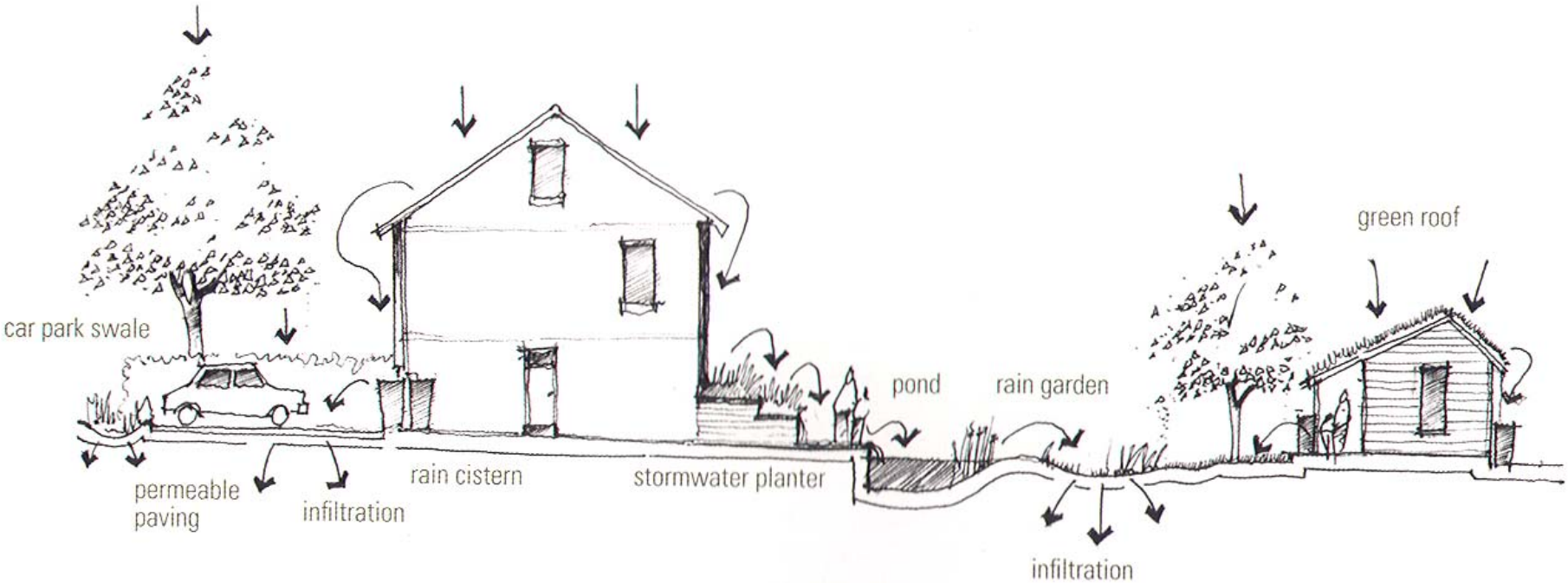


Non-sustainable HUMAN practices

Solutions - Stormwater Runoff

- <u>Reduction</u> through the use of bio-swales, rain gardens, green roofs and walls

- <u>Infiltration</u> by using permeable paving materials



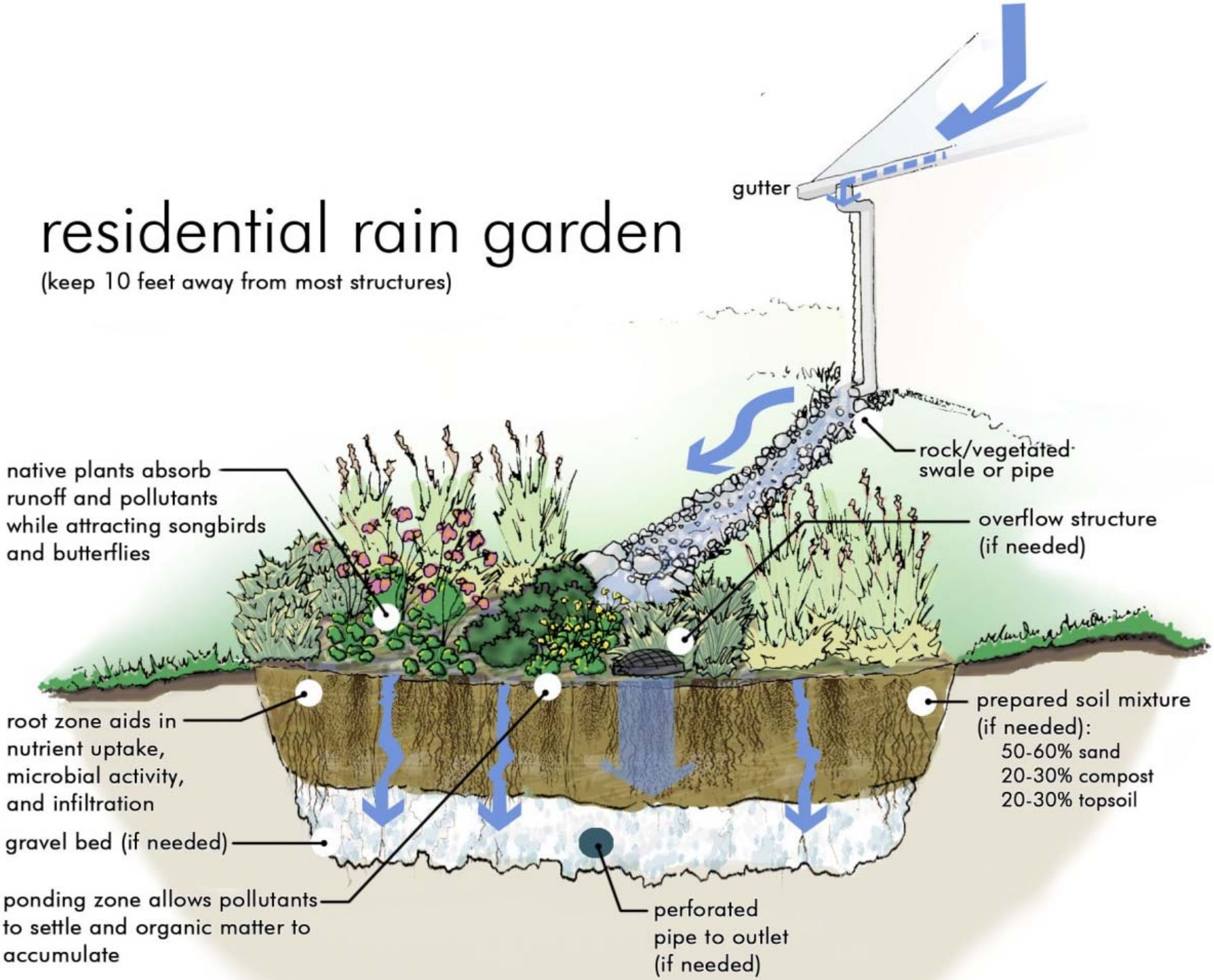
Bio-Retention
Bio-swales

Infiltration Raingarden Planters

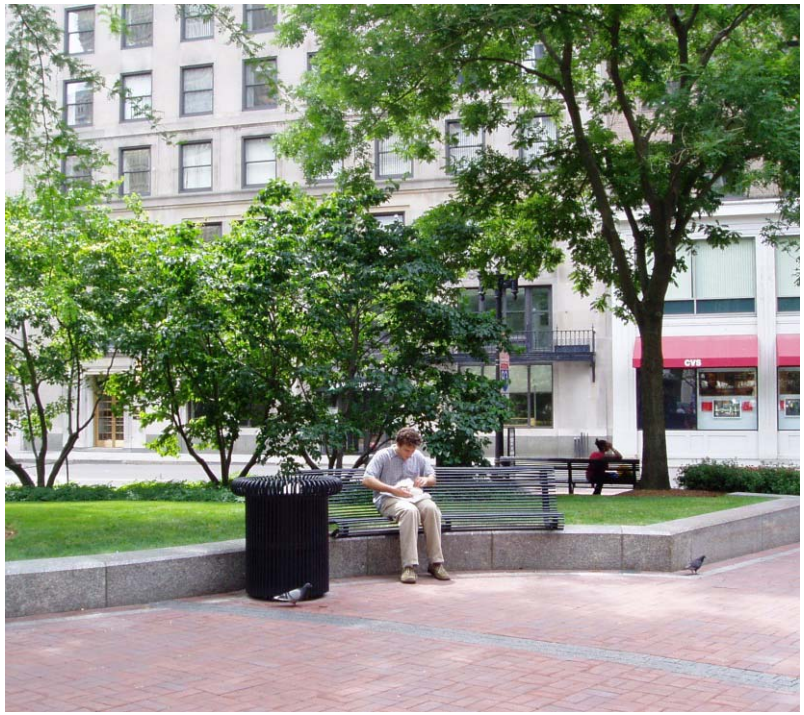
Raingardens

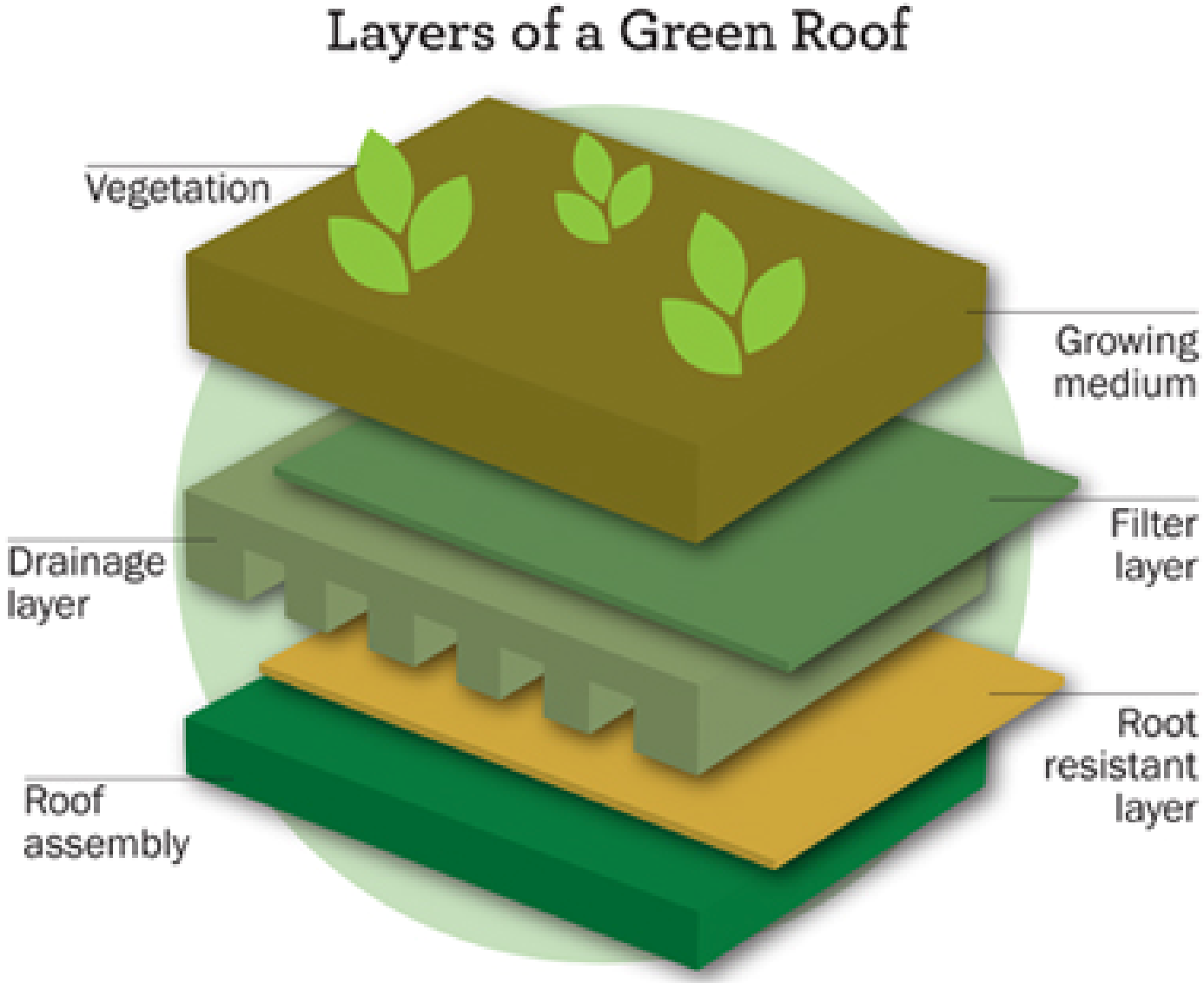
residential rain garden

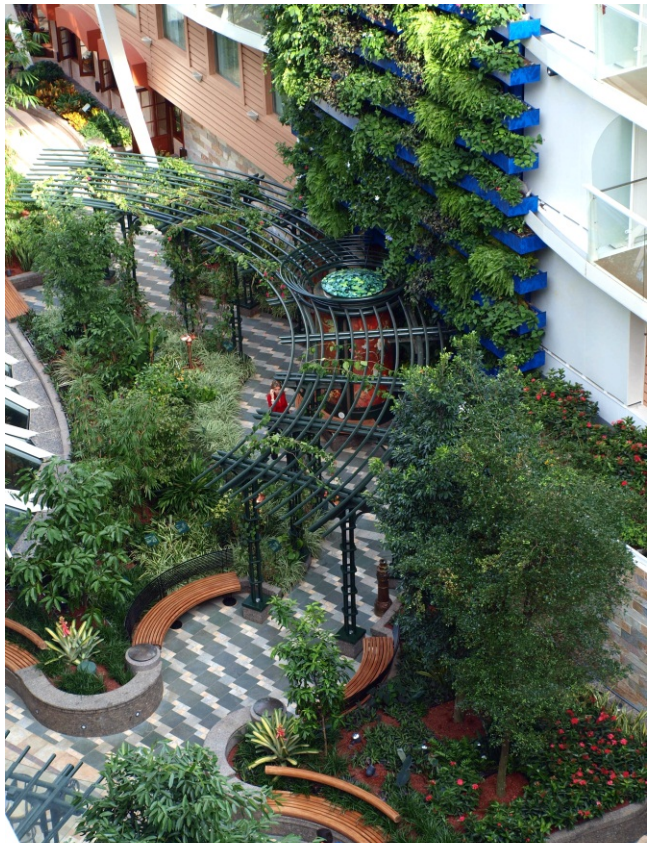
(keep 10 feet away from most structures)



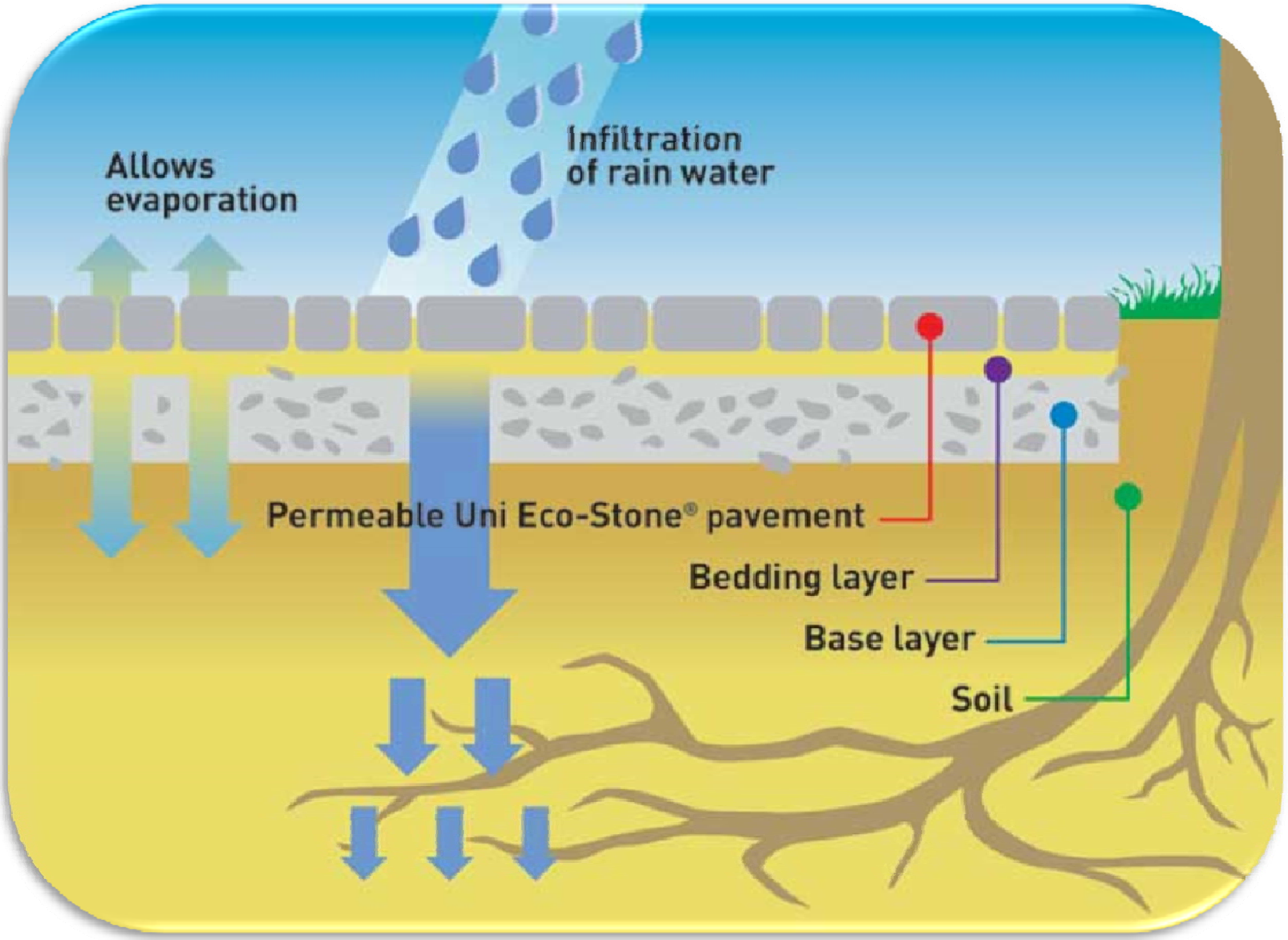
Green Roofs

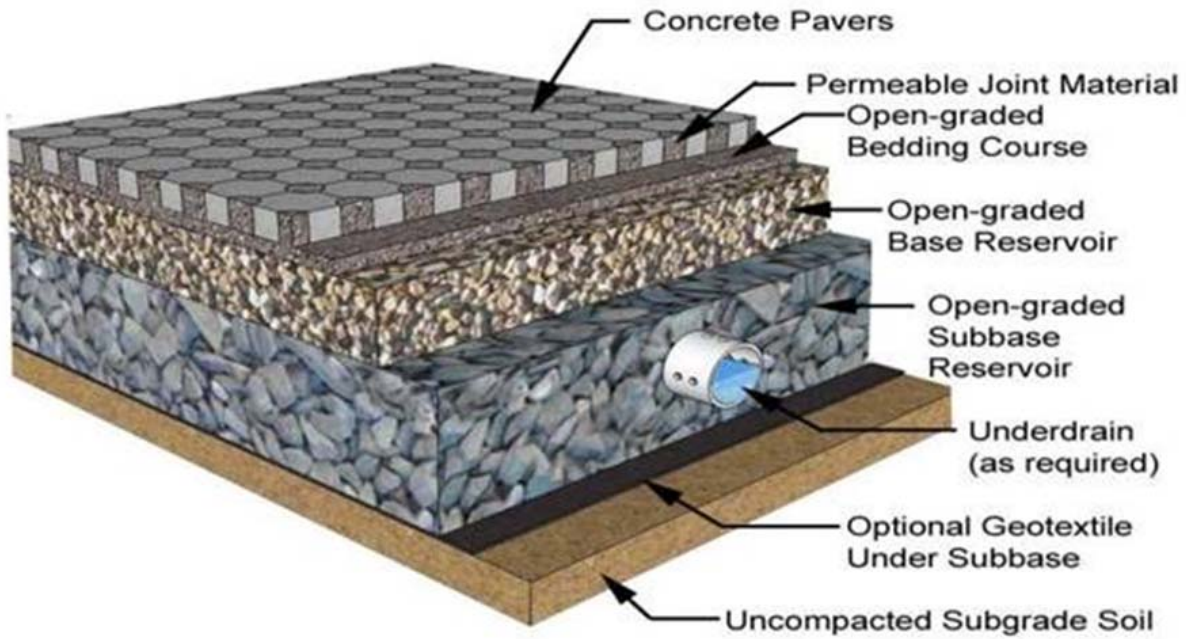

CVS

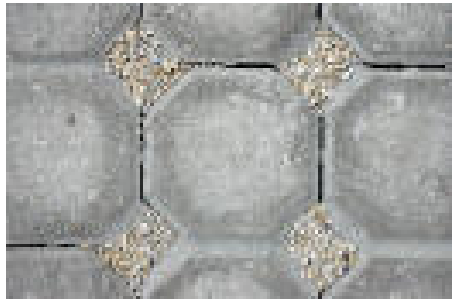

Layers of a Green Roof
Vegetation
Growing medium
Filter layer
Drainage layer
Root resistant layer
Roof assembly



Porous Paving




Concrete Pavers
Permeable Joint Material
Open-graded
Bedding Course
Open-graded
Base Reservoir
Open-graded
Subbase
Reservoir
Underdrain
(as required)
Optional Geotextile
Under Subbase
Uncompacted Subgrade Soil

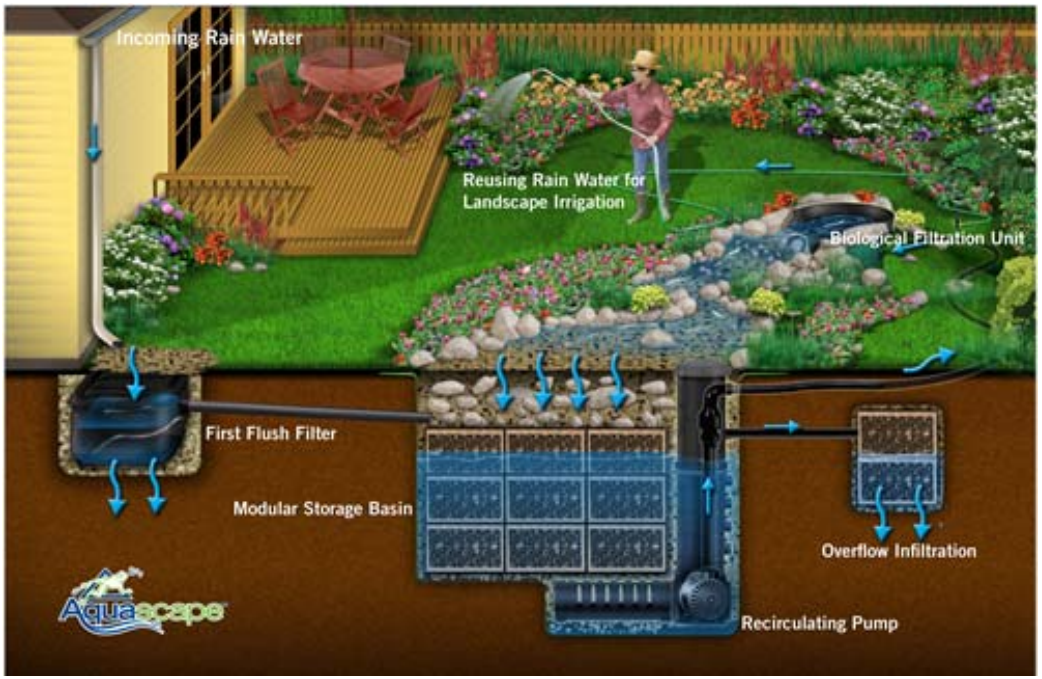



S Rindge Ave
Arlington Reservoir
Lowell St
Mill Brook
Drake Rd
Hurd Field
Minuteman Bikeway
Massachusetts Ave.
Park Ave
0
300 Feet
Hurd Parking Lot
Minuteman Bikeway
Sources: Bing Maps (c) 2009 Microsoft Corporation and its data suppliers.
Created by the US EPA GIS Center on 8/1/2012.
Map Tracker ID: 8564
Hurd Field Parking Lot
Arlington, MA
EPA

Porous Asphalt

Solutions
Water Use

- Reduction through design of water-wise garden techniques - xeriscaping
- Conservation techniques - rainwater harvesting
- Landscape irrigation using water from showers and sinks, known as gray water


Incoming Rain Water
Reusing Rain Water for Landscape Irrigation
Biological Filtration Unit
First Flush Filter
Modular Storage Basin
Overflow Infiltration
Recirculating Pump
Aquascape

Conserving Water in the Landscape

- Harvest rainwater
- Mulch and weed plant beds
- Re-use gray water - water from bathing or washing clothes, fish tanks, dehumidifiers, etc
- Use a soaker hose or a drip irrigation system with a timing device
- Sweep sidewalks with a broom, not water
- Use a hose nozzle
- Group plants according to water needs
- Plant native plants that don't require extra watering
- Water only during the coolest part of the day - morning or late evening
- Use a rain gauge and test the soil moisture before watering
- Adjust irrigation timers according to the season and the weather
- Reduce the size of your lawn
- Mow your lawn with the blades set higher (at least three inches)
- Avoid garbage disposals – compost instead

Solutions Maintenance

- Integrated Pest Management (IPM) techniques for pest control and sustainable cultural practices

- Using less-polluting landscaping tools and equipment, especially in the maintenance stage

- Bio-filtering of wastes through constructed wetlands

Integrated Pest Management

Prevention:

How can I prevent problems from happening?

Monitoring:

Is it really a problem or just an isolated incident?

Analyzing:

How much damage am I willing to tolerate?

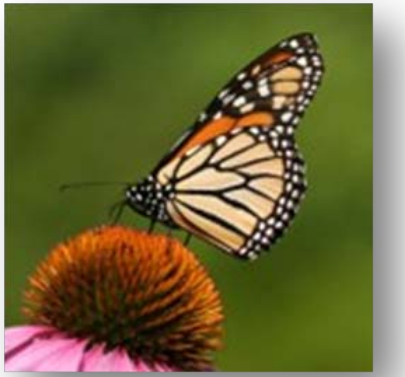
Control:

How can I stop it before the damage spreads?

Why use it ?

- balance = less problems
- allows the “good” insect population to survive –pollinators and those that control bad insects
- healthy and fertile soil = healthier plants and more nutritious vegetables
- safe place for kids and pets

Prevention Methods



- Plant varieties that are suited to your site.
- Encourage beneficial insects.
- Know local insects and diseases and plant resistant varieties.
- Interplant vegetables, to slow the spread of problems.
- Stake plants to keep them off the ground and dry.
- Water regularly, so plants aren't stressed by drought.
- Mulch to prevent splashing soil and pathogens onto plants.
- Rotate your crops to prevent the problem from over-wintering.
- Remove and dispose of diseased or infested plants.
- Remove all plant debris in the fall, so there is no shelter for over-wintering garden pests and spores.

Solutions Wildlife

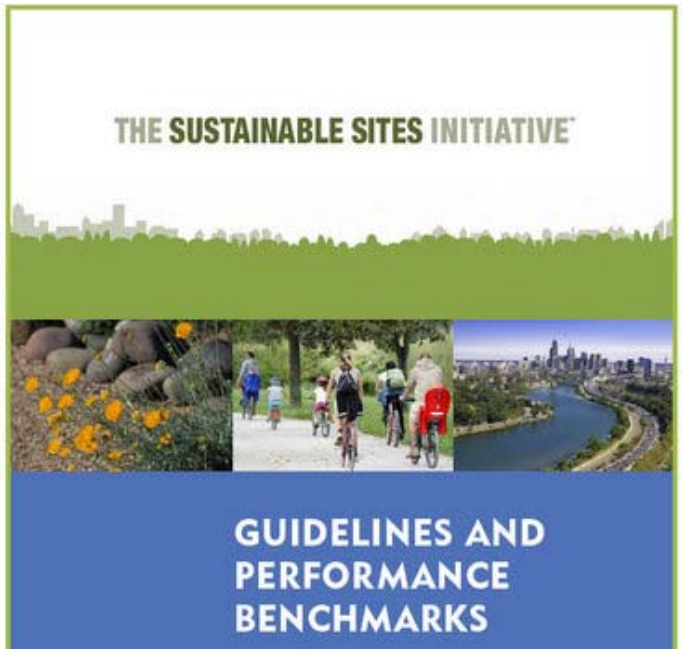
- Create and enhance wildlife habitat
- Use more native plants and be aware of the dangers of exotic invasives
- Create edible landscapes for wildlife and people
- Use soil management techniques, including composting kitchen and yard wastes - maintains and enhances healthy soil that supports a diversity of soil life
- Reduce your lawn and use organic lawn care

Homeowner Programs

to encourage and support habitat preservation, creation, and restoration in the landscape

- National Wildlife Federation Backyard Habitat program

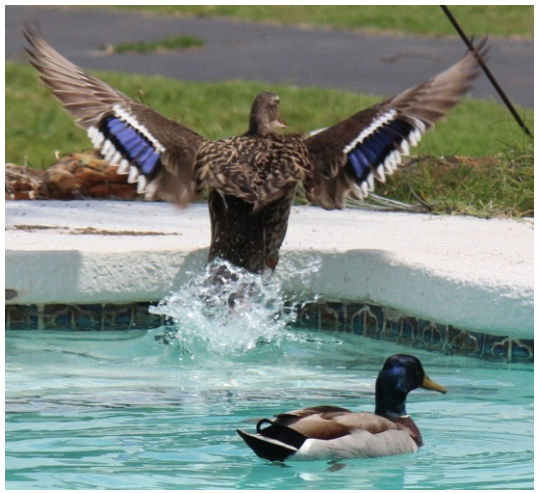
- Sustainable Sites Initiative (SITES) - fosters a transformation in land development and management practices



National Wildlife Federation Backyard Habitat program

Criteria:

- create a food source for wildlife
- provide water, cover, and a place to raise young
- use sustainable gardening practices



Native Plants

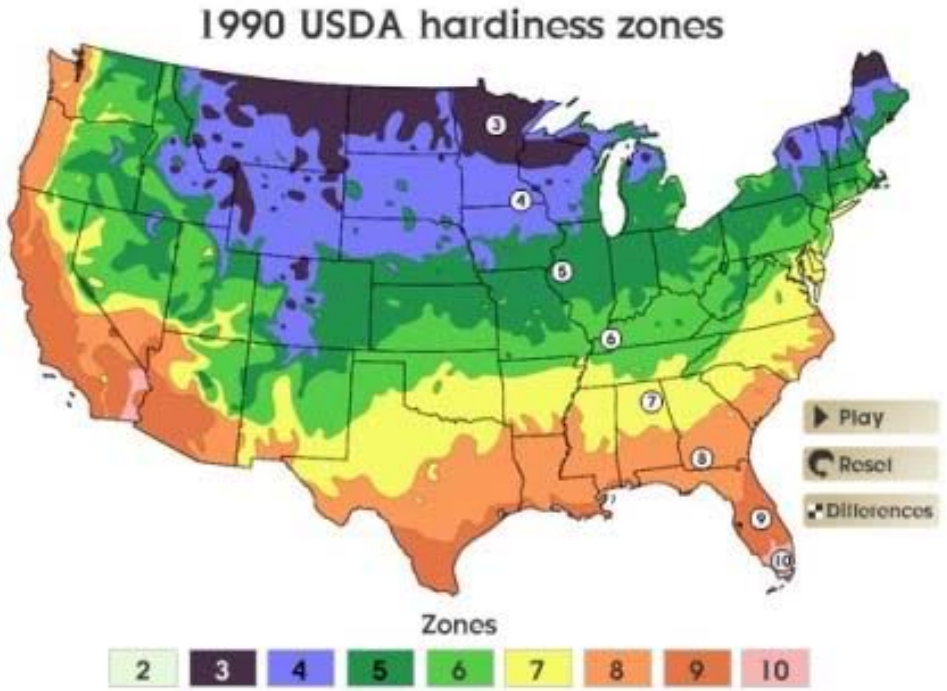
- well adapted to survive in a particular geographic area
- usually require less maintenance
- welcomed by wildlife, serving an important role in the local ecosystem
- support 10-50 times more species of wildlife as non-native plants

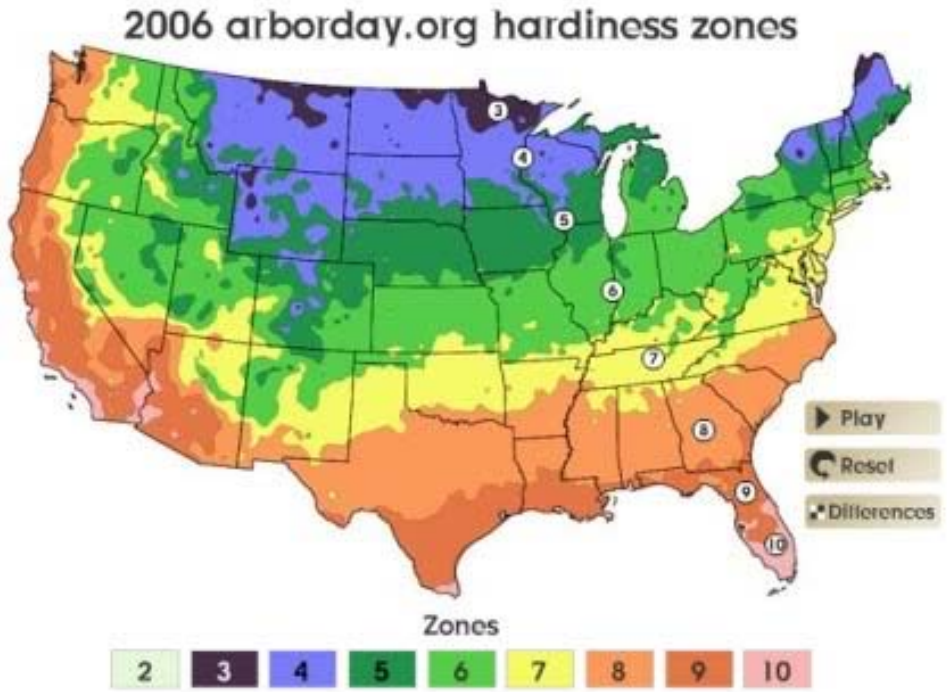
Non-native plants

- serious problems if the species spread aggressively - becoming “invasive”
- an "invasive" species is a non-native plant that outcompetes native species for habitat and food
- not all exotic species are invasive, BUT, those that are can cause tremendous problems
- with global warming, many of these species are expected to gain even more of a foothold

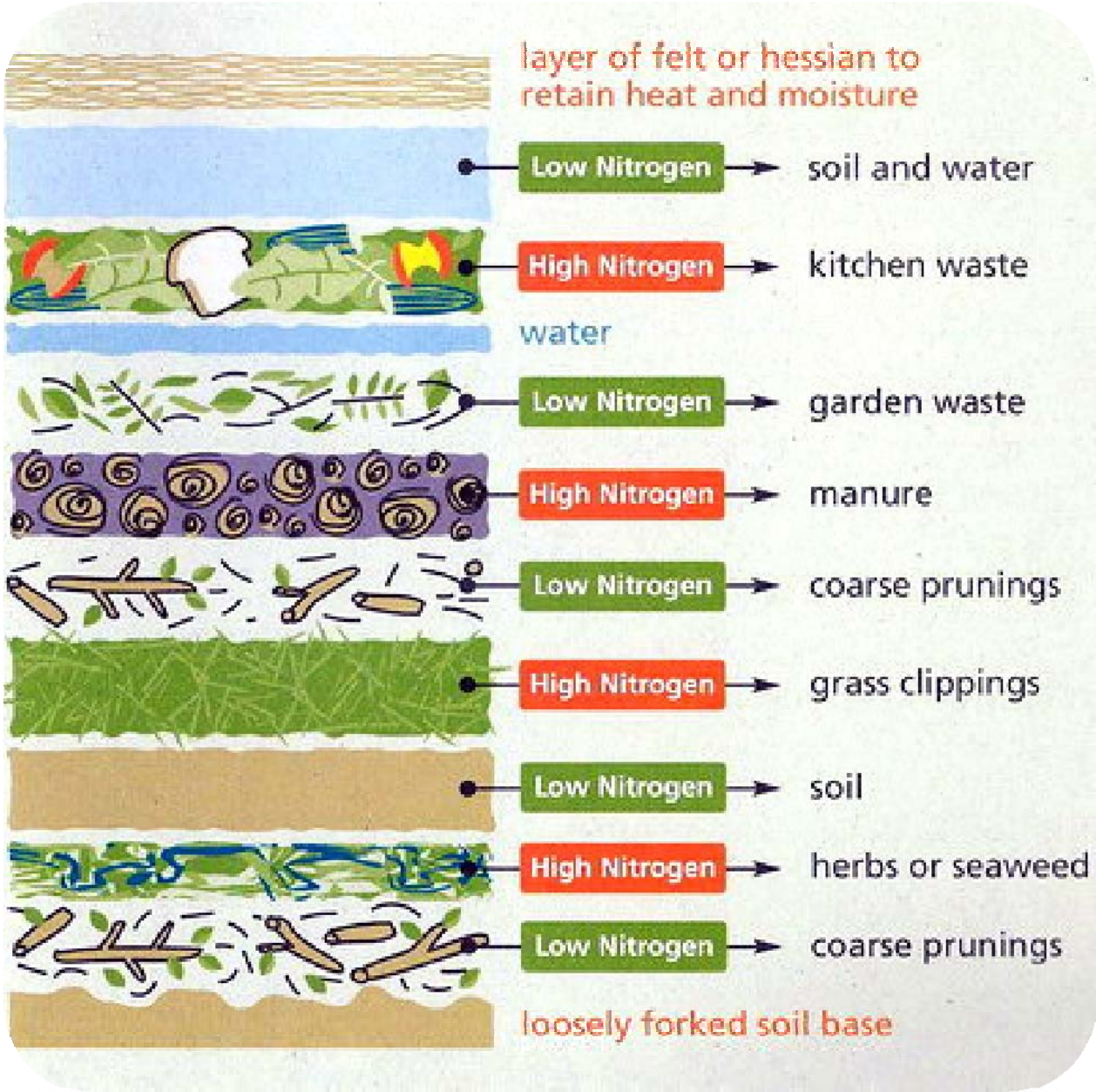

USGS

Climate Change





Composting


layer of felt or hessian to retain heat and moisture
Low Nitrogen
soil and water
High Nitrogen
kitchen waste
water
Low Nitrogen
garden waste
High Nitrogen
manure
Low Nitrogen
coarse prunings
High Nitrogen
grass clippings
Low Nitrogen
soil
High Nitrogen
herbs or seaweed
Low Nitrogen
coarse prunings
loosely forked soil base

History of Lawn in America

- The lawn has its “roots” in the English country estate where they provided sweeping vistas and were mowed and fertilized by flocks of sheep

- traditionally included flowering clover which naturally fixes nitrogen and improves the soil– also great for wildlife

- 19th century suburban America embraced the weed and clover free “perfect” lawn

Conventional Lawns - the FACTS

- 20 million+ acres of lawn -- 32,000 square miles in the United States, covering more land than any single crop
- Average lawn uses 10,000 gallons of water over one summer
- 50-70 percent of our residential water is used for landscaping, most of it to water lawns
- A gas-powered lawn mower emits 11 times the air pollution of a new car
- EPA estimates 70 million pounds of active pesticide ingredients are applied to suburban lawns each year
- Single largest source of water pollution - runoff

Traditional lawns are biological deserts and environmentally destructive

Conventional Lawns - the FACTS

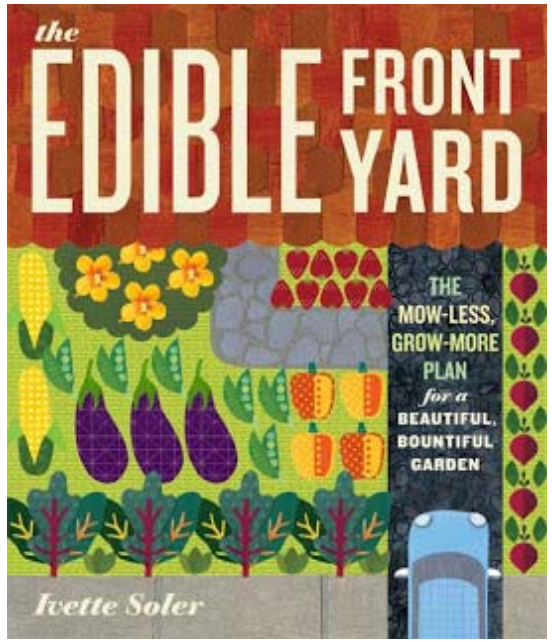
- Homeowners use approximately 78 million pounds of pesticides every year, spending $9.3 billion dollars, mainly for aesthetic purposes.
- According to the EPA, 74% of homeowners use pesticides on lawns and gardens.
- Of the 30 most commonly used lawn pesticides, 19 are carcinogens, 16 are toxic to birds, 24 are toxic to fish, and 11 are deadly to bees.
- Approximately 7 million wild birds and 6 to 14 million wild fish are killed annually by pesticide poisoning, mistaking the small pesticide pellets for seed and grain.
- The EPA has stated that no pesticide is safe.

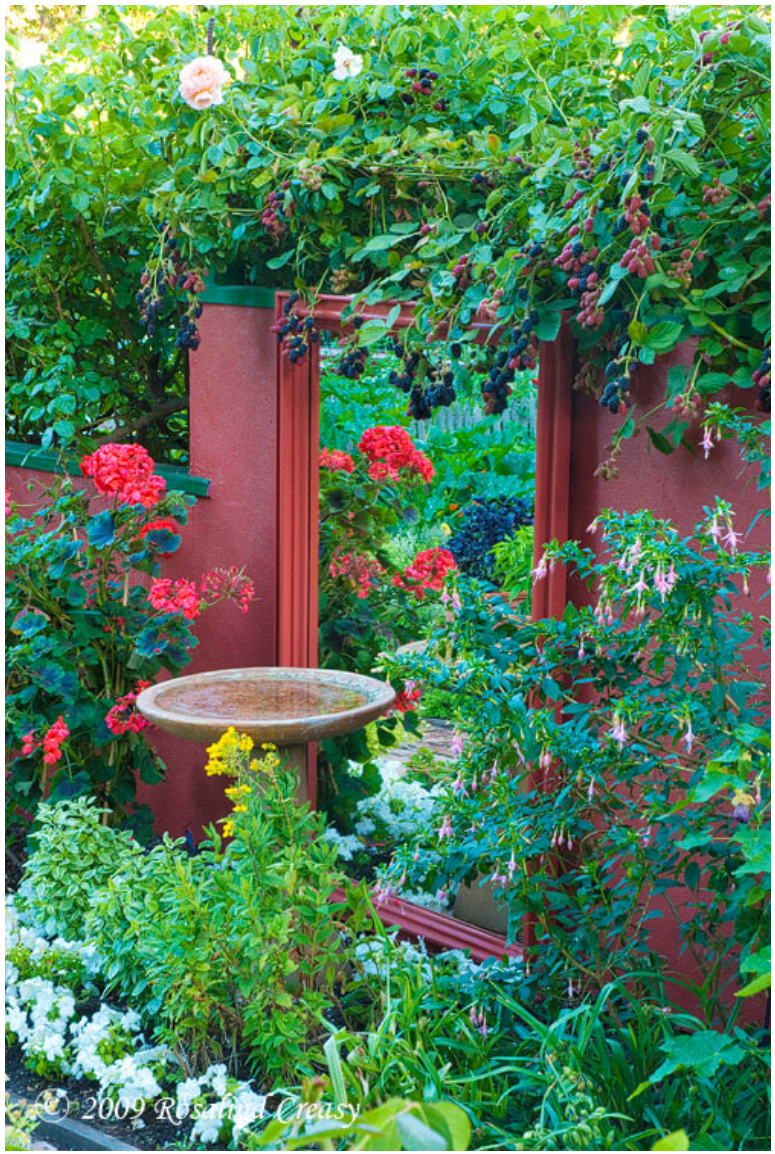
WE NEED TO CHANGE !

Benefits to Replacing Lawns with Local Native Plants

- Reduces water needs
- Provides a landscape that can prosper despite temperature fluctuations
- Reduces the amount of chemical pesticides and fertilizer needed
- Benefits wildlife populations
- Reduces the potential of an eyesore during droughts

Lawn Alternatives
Edible Landscapes





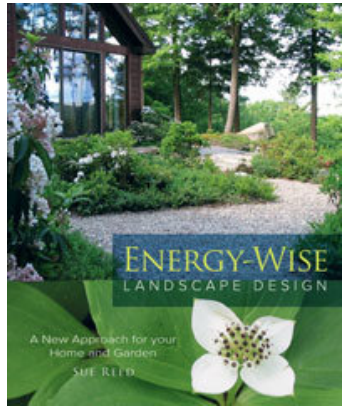
WDG

Lawn Alternatives
Eco-landscapes

Solutions - Energy

- Energy-efficient landscape design - proper placement and selection of shade trees - creation of wind breaks
- Renewable energy, including solar landscape lighting
- Sustainably harvested wood - composite wood - plastic lumber
- Recycling of products - glass, rubber from tires and other materials to create paving stones, mulch and other products
- Use of local products – stone, wood – and salvaged materials

Energy wise Landscape Design Techniques



- Planting trees to provide shade
  - reduces cooling costs.
- Planting or building windbreaks to slow winds near buildings
  - reduces heat loss.
- Earth sheltering and positioning buildings to take advantage of natural landforms as windbreaks.
- Green roofs that cool buildings with extra thermal mass and evapotranspiration.
- Reducing the heat island effect with pervious paving, high albedo paving, shade, and minimizing paved areas.
- Site lighting with full cut off fixtures, light level sensors, and high efficiency fixtures

Thank you!
Questions?

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