



Maintaining Your Rain Garden & Cistern

Craig Chatburn
Seattle Public Utilities
Installing Rain Gardens & Cisterns
Training for contractors, Nov. 3, 2011
www.seattle.gov/util/rainwise



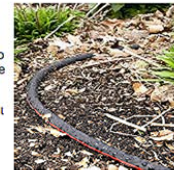
Caring for Your New Rain Garden

Seattle
Public
Utilities

Like any new planting, your rain garden needs care to help the plants grow – especially during the first growing season, and through the first few years until the plants mature and fill the space.

Follow these steps to success:

- ☑ **Water it.** Young plants need water until their roots grow deep, especially through the first one or two summers. Lay out a soaker hose so it loops close to every plant; then cover the hose with mulch to help spread and conserve water. In summer, start by running the hose 1 hour each week. Watch your plants for signs of drooping on hot days, and increase watering frequency if needed. You can also add water with a watering wand – direct the spray at the base of each plant for about a minute.
- ☑ **Weed it.** Weeds can choke young plants and spread quickly. Pull weeds by hand or with a long-handled weed puller. Get weeds early in the spring before they go to seed or make deep roots, to save more work later. Weed again in late spring, and again in early and late fall. Watch for invasive weeds that spread by roots (like ivy or morning glory) – be sure to dig out all the root!
- ☑ **Mulch it.** Mulch prevents weeds, conserves water, and protects roots. Replenish the mulch at least once a year, to maintain a mulch depth of 2-4 inches. The best mulch is “arborist wood chips” – you can get it free if a tree service is working in your neighborhood. Wood chip or coarse bark mulch from a garden store works well too, or shredded leaves (but watch for weed seeds that might come with the leaves).
- ☑ **Watch it.** Watch for falling plants – if you can’t figure out the problem, call the Garden Hotline (below). Re-stake trees if they need more support, but plan to remove stakes and ties after the first year. Prune off broken branches, and prune to make clearance over sidewalks and streets as they grow. Cars can damage roots – protect root areas of trees and plants from vehicle traffic.
- ☑ **Keep it flowing.** Go out in the first big rain of the fall, and again in winter, to make sure water is flowing into the rain garden. You may need to clean drains or do some shovel work to help the flow.



Questions?

Contact Seattle Public Utilities' Garden Hotline at (206) 633-0224 or email help@gardenhotline.org

Learn more at www.seattle.gov/util/rainwise

Caring for your New Rain Garden, no. 4/2010



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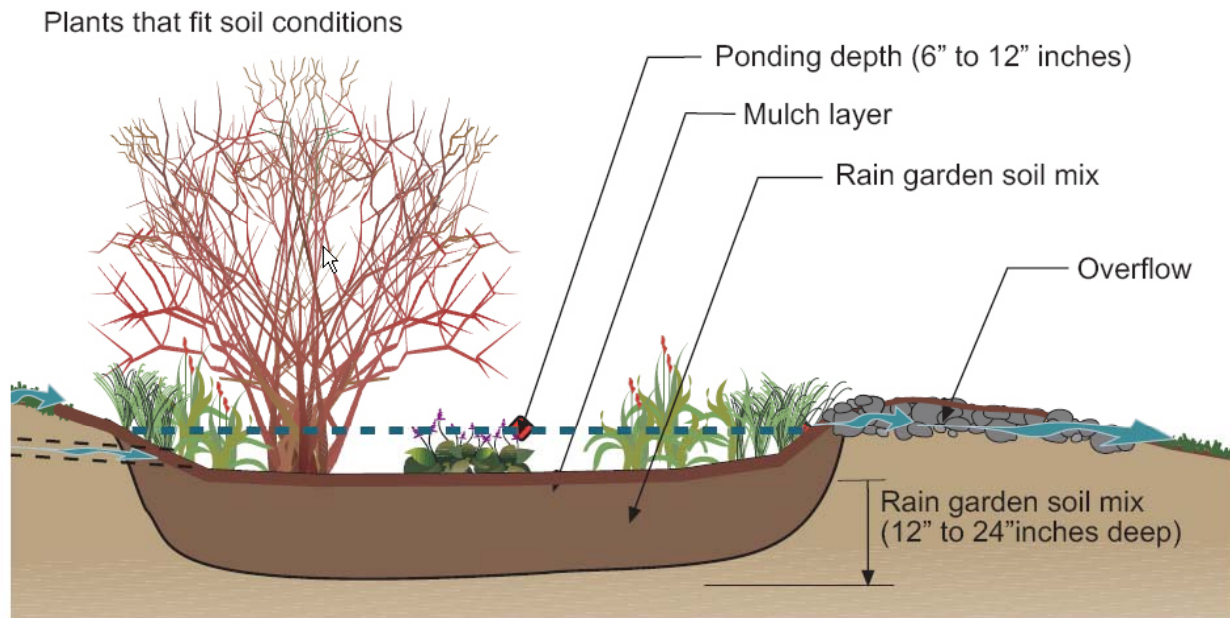
How to guide for rain garden care

- **Water** your new plants regularly for the first 1-3 years, until they are well established.
- **Weed** in spring, summer, and fall until the plants close in. **Don't use fertilizers or pesticides.**
- **Mulch with arborist woodchips annually** to feed the soil, conserve water, reduce weeds, until the plants close in to shade out weeds.
- **Watch** the inflow and overflow areas keep free of debris, and protected from erosion.



What makes a rain garden work so well?

- Compost is the key to rain garden performance.
- Compost brings in billions of beneficial microbes that create stormwater sponges.
- Caring for soil microbes will ensure the rain garden continues to soak up stormwater.





Foodweb Analysis Soil Amendment

Report prepared for:

Stenn Design
Stenn Howard
21716 Westside Hwy SW
Vashon, WA 98070 USA

howard@stennsdesign.com

Report Sent: 2/10/2011
Sample#: 01-110925 | Submission:01-021032
Unique ID: EVC
Plant:

Invoice Number: 6485
Sample Received: 2/4/2011

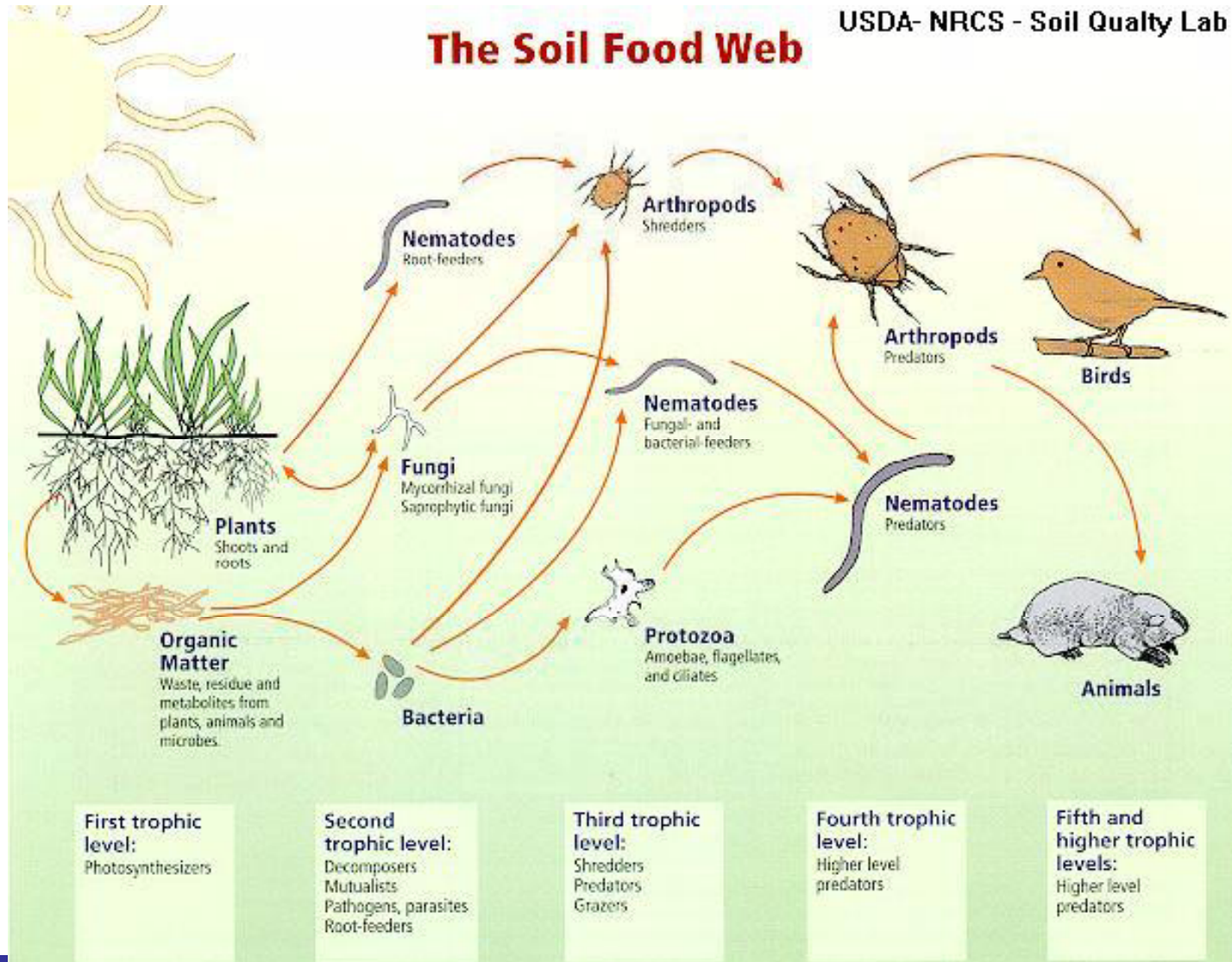
For interpretation of this report please contact:
Soil Foodweb Oregon
info@oregonfoodweb.com
(541) 752-5066

Consulting fees may apply

Organism Biomass Data	Dry Weight	Active Bacteria (µg/g)	Total Bacteria (µg/g)	Active Fungi (µg/g)	Total Fungi (µg/g)	Hyphal Diameter (µm)	Nematode detail (# per gram or # per mL) Classified by type and identified to genus. (If section is blank, no nematodes identified.)	
Results	0.580	61.2	1835	16.1	1487	2.8	Bacterial Feeders	3.88
Comments	In Good Range	Above range	In range	In range	Above range		Panagrolaimus	0.26
Expected Range	Low	15	100	15	100		Pelodera	1.12
	High	0.85	25	3000	25	300	Rhabditidae	2.50
		Protozoa (Numbers/g)			Total Nematodes #/g	Mycorrhizal Colonization (%)		
		Flagellates	Amoebae	Ciliates		ENDO	ECTO	
Results	23901	79413	0	6.69	Not Ordered	Not Ordered		
Comments	High	High	Low	Low				
Expected Range	Low	10000	10000	50	20			
	High			100	30			
Organism Biomass Ratios	Total Fungi to Tot.Bacteria	Active to Total Fungi	Active to Total Bacteria	Active Fungi to Act.Bacteria	Plant Available N Supply (lbs/ac)	Actino Bacteria (µg/g)		
Results	0.81	0.01	0.03	0.26	200+	64.2		
Comments	Good	Good	Good	Low				
Expected Range	Low	0.75	0.01	0.01	0.75			
	High	1.5	0.1	0.1	1.5			



Compost adds billions of beneficial microbes to a rain garden.





Bacteria Role



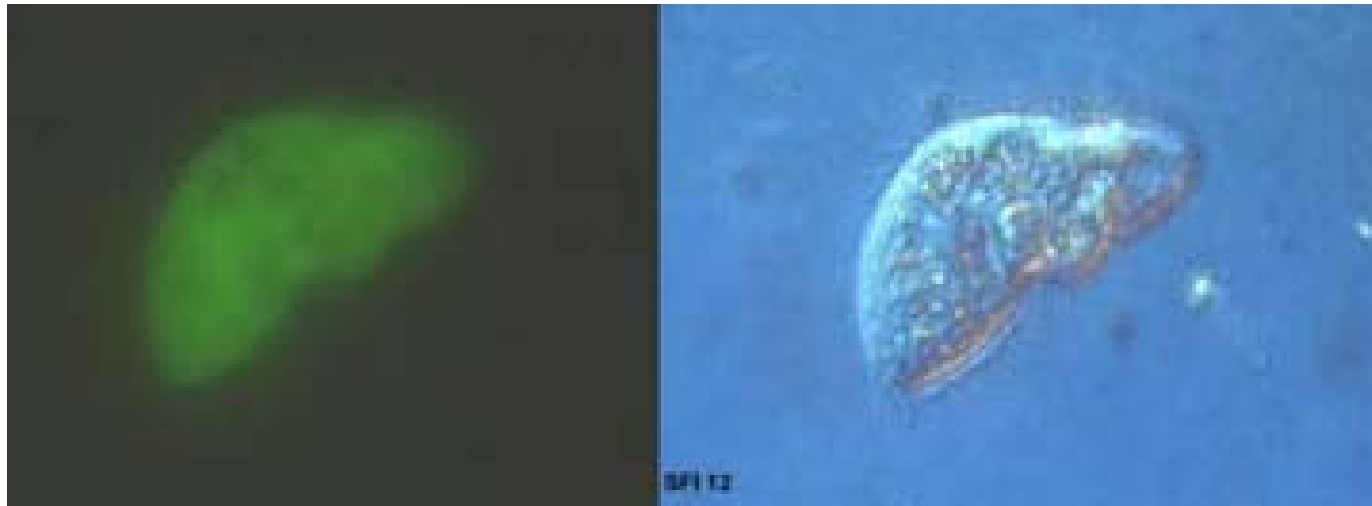
1. Pull nitrogen from the air creating natural fertility in the soil
2. Important food source for other beneficial microbes
3. Improve soil structure and **reduces erosion**
4. Filter and degrade **stormwater** pollutants
5. Compete with disease causing organisms



Protozoa



- Ciliates, Amoebae, Flagellates – (1/50”-1/5000”)
- **Release nutrients** for plants
- Increase decomposition rate and **soil formation**
- Prevent some pathogens on plants
- Provide prey for nematodes





Nematodes



- Convert nutrients into plant available form
- Regulate population of other organism
- Provide food source for other organisms that **influence soil structure**
- Consume disease-causing organisms





Soil Arthropods



- Sowbugs, dung beetles, mites, millipedes, spiders, centipede, ants
- **Improve soil structure** by burrowing & fecal matter!
- Control disease causing organisms
- Improve decomposition by shredding plant litter and mixing soil





Earthworms



- Shred and increase organic matter surface area, increase microbes and nutrients
- Improve soil stability and **water holding capacity**
- Mix organic matter deep into soil
- Form deep **infiltration** channels
- Improve root growth





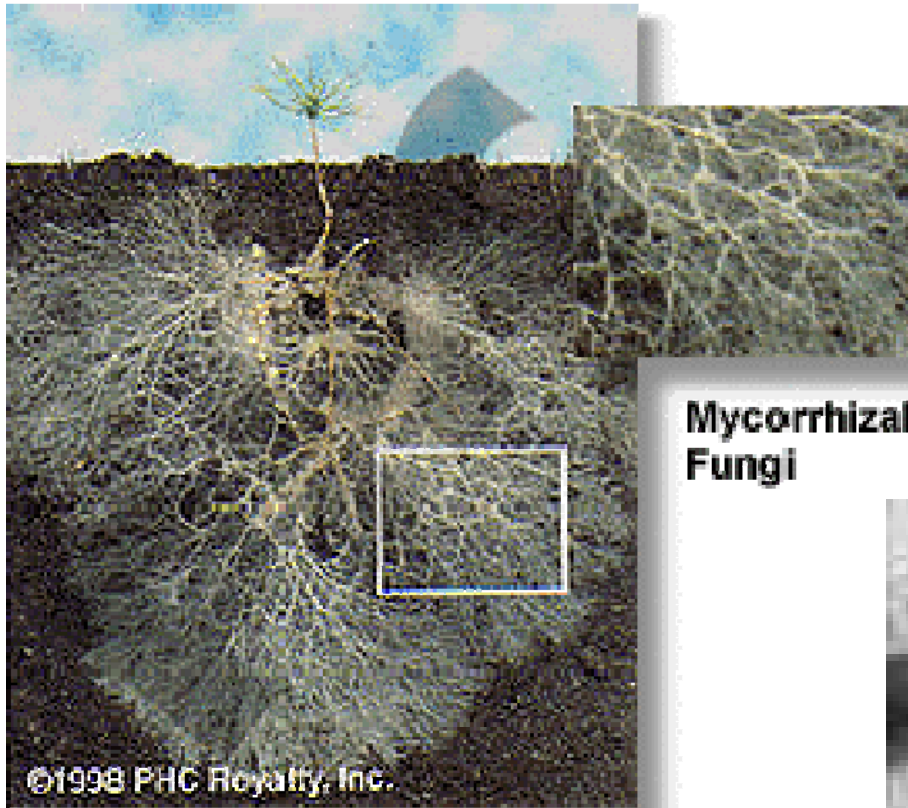
Fungi Role



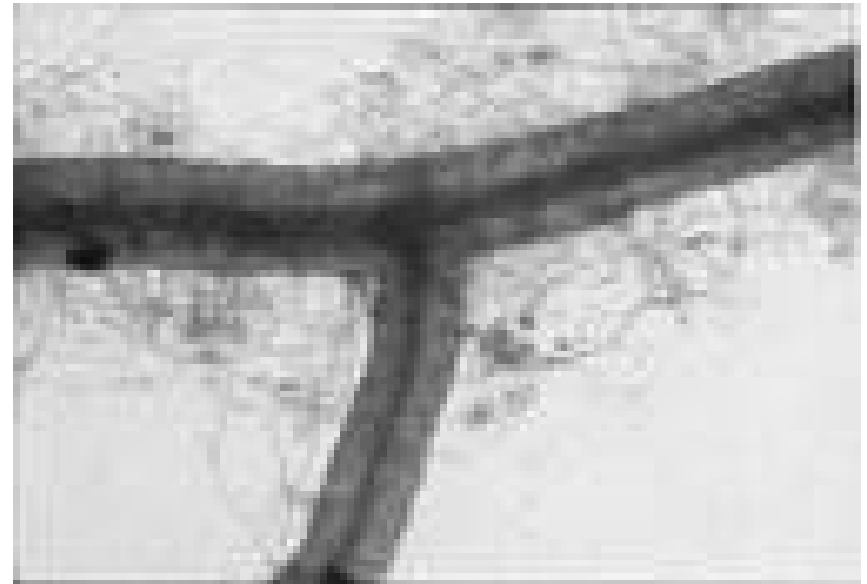
- Physically bind soil particles, **reducing erosion**
- **Retain nutrients in fungal biomass**
- **Decompose stormwater pollutants**
- Colonize roots increasing plants moisture & nutrient access in exchange for plant sugars
- Mycorrhizal fungi 100X expansion of plant root system
- Compete with plant pathogens



Plant Fungus Relationship



Mycorrhizal Fungi



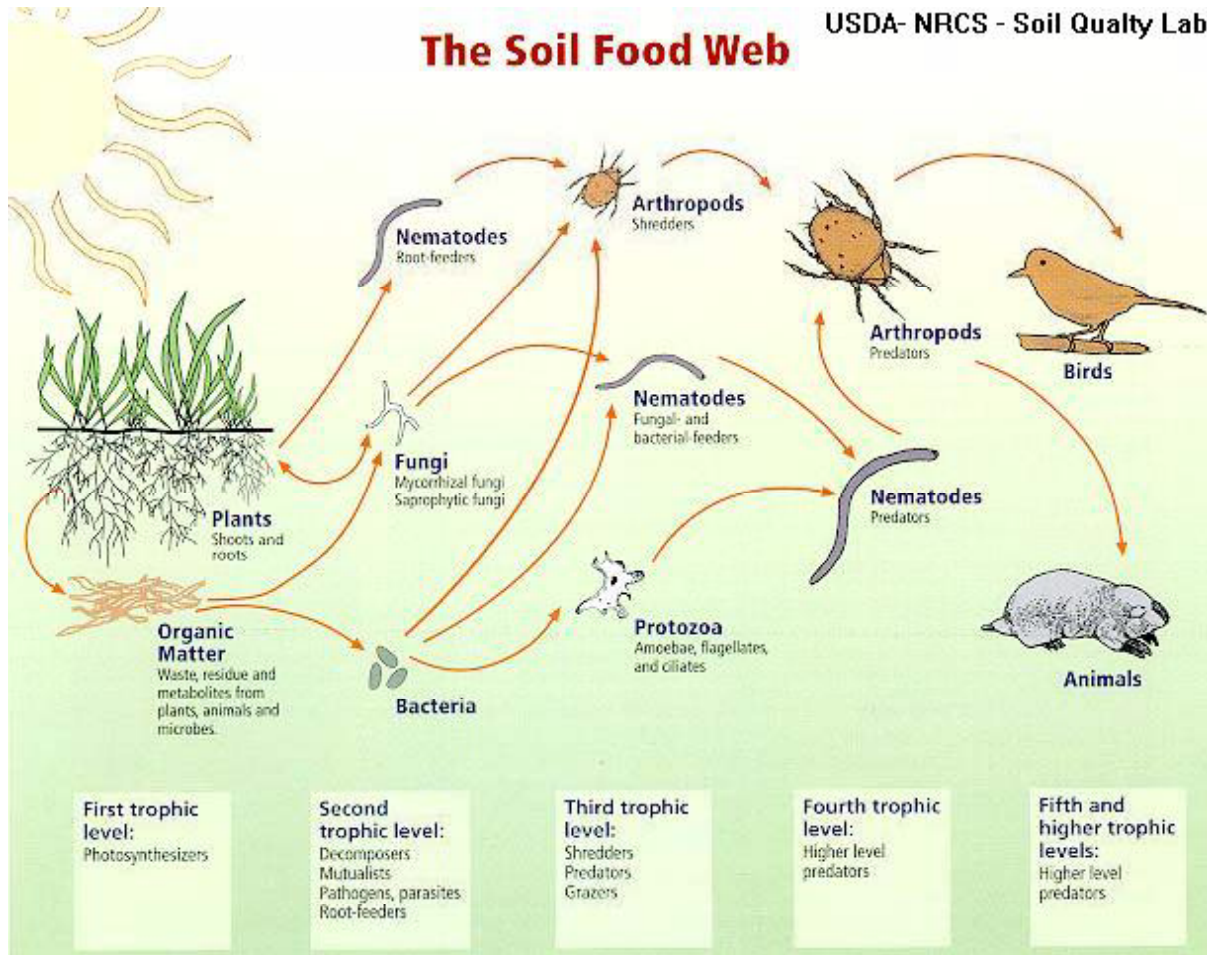


MULCHING Organic Matter MATTERS!





The fuel for this engine is leaf litter and plant debris





Mulch Types & Sources:

Wood Chip or Tree Trimming Mulch: Available free from commercial tree services as a by-product of pruning, tree trimming mulch is a variable mix of shredded wood (limbs), leaves and conifer needles. Although it may contain weed seeds, spread disease and/or grow mushrooms (do not eat!), chipped tree trimmings make an effective, inexpensive moisture-holding mulch that lasts longer and has more structure (woody material) than leaves, bark or compost mulches.

Leaves and Grass Clippings: Available free from your yard (or from neighbors), fall leaves and grass clippings may be added to planting beds as mulch and allowed to compost in place. If you dislike the odor and appearance of composting leaves or grass clippings, an alternative is to compost the materials before putting them on planting beds. See Compost.

Bark Mulch: Available commercially by the cubic yard, bark mulch is a by-product of the timber industry. Consisting primarily of Douglas fir and hemlock bark, it comes in coarse, medium-fine and fine textures and is often installed for aesthetics as much as for mulch. Bark mulch may be contaminated with weed seeds and salt, is naturally waxy and repels rain - all creating poor conditions for plant growth. It can also be tough on hands! Avoid using fine bark, cedar chip or sawdust products that can be especially water-repellent and harmful to plants.

Compost: Available commercially by the cubic yard or free from your own home composter, compost is a recycled product made from aged yard waste, manure and other biosolids. With an attractive dark brown soil-like texture, compost can be used as mulch or mixed into soil to improve fertility. Compost mulch can form a dry "crust" that resists water at first. It also breaks down quickly, meaning more frequent re-mulching.

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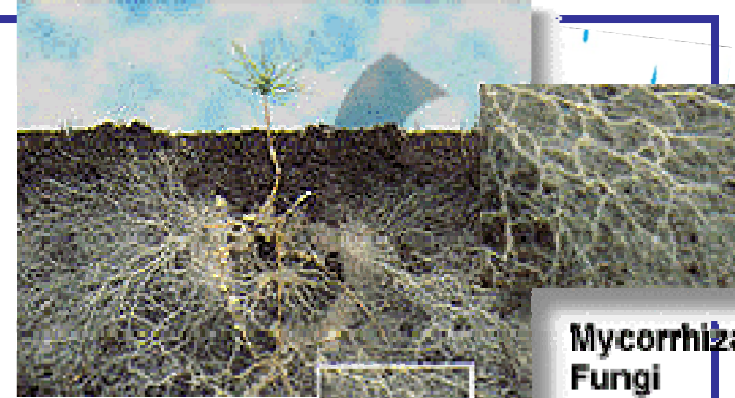
Gardening tasks that can wreck rain gardens!

1. Use of non-organic fertilizer
2. Use Herbicides, Fungicides, Insecticides
3. Rotor-tilling
4. Use of Weed barriers (fabric or plastic)
5. Repeated removal leaves, and plant debris
6. Mulches lacking diversity – beauty bark, lava rock, washed playchips, sawdust





3. Rototilling

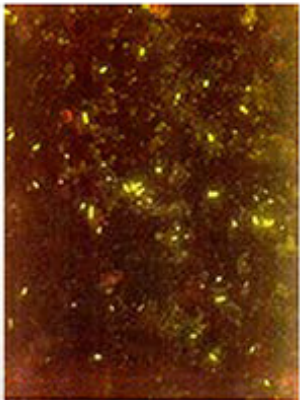


Mycorrhizal Fungi

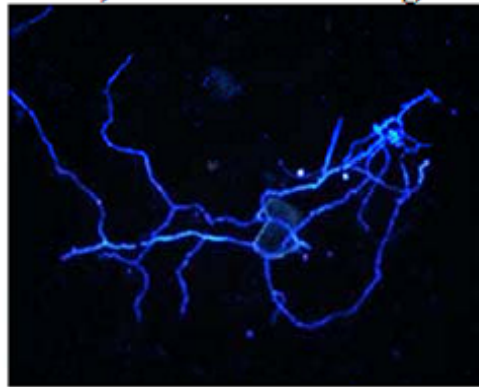
Soil Biota Enhancement

Soil contains macroflora, microflora, macrofauna, mesofauna and microfauna. A cup of undisturbed native topsoil can contain:

200 billion Bacteria



100,000 meters of Fungi



20 million Protozoa



100,000 Nematodes



Earthworms <1

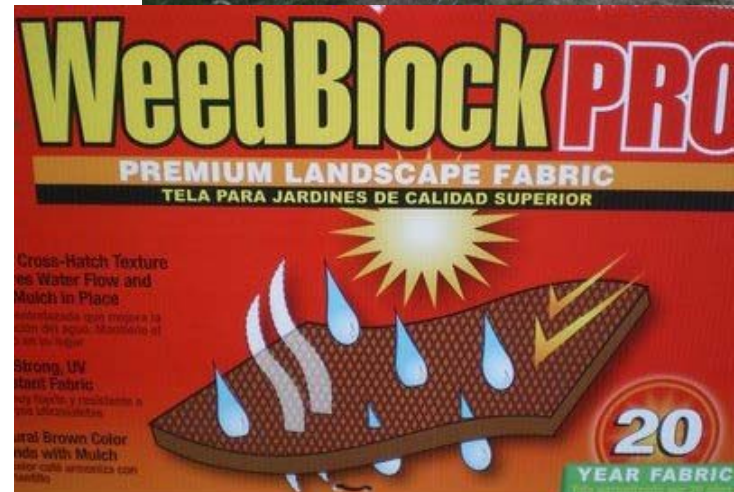


50,000 Arthropods





4. Use of Weed blockers (fabric or plastic) prevents access to organic matter





5. Repeated removal of leaves, and plant debris





6. Mulches lacking diversity– beauty bark, lava rock, washed play-chips, sawdust





Rain Gardens Success Depends on Your Client Understanding:

1. Healthy Soil = Healthy Plants
2. **Do not use fertilizers or pesticides.**
3. Feed the Soil, Not the Plant
4. **Replenish arborist woodchip mulch annually**



Homeowner 'how to': Build Healthy Soil

- <http://your.kingcounty.gov/solidwaste/naturalyardcare/index.asp>

Resource-efficient
Natural Landscaping
Design • Build • Maintain

May, 2007 This guide is divided into sections for the Design, Building, and Operations & Maintenance phases of a project, plus Resources.



WHY GO NATURAL?

Landscape professionals from around the Northwest have contributed and tested these ideas for resource-efficient, sustainable, cost-effective landscaping. They can be applied to any landscape design or use, from conventional lawn-and-bed designs to native restorations to innovative urban landscapes. Integrating these ideas from the initial project design stage through construction and into long-term maintenance will reap the most benefits.

Benefits

- More attractive landscapes
- Easier maintenance
- Lower water, waste, and energy bills; less need for fertilizers and pesticides
- Better storm water detention and filtration
- Better air and water quality
- Better habitat for wildlife and people
- Higher property values

5 Steps to Successful Landscapes

- 1) Build healthy soil** Preserve existing soil and vegetation (especially trees) where possible. Amend disturbed soils with compost. Mulk existing landscapes regularly with wood chips, coarse bark, leaves or compost.
- 2) Plant right for your site** Fit landscape uses to your site's conditions, and choose plants that need less water, have few pests, and thrive in the Northwest climate.
- 3) Water smart** After building healthy soil and selecting low-water use plants, group plants by water need, use more efficient irrigation methods like drip and soakers under mulch, and design and maintain irrigation systems to reduce waste.
- 4) Think twice before using pesticides** Proper plant selection, plant care, and integrated pest management techniques can practically eliminate the need for weed and bug killers, reducing health risks.
- 5) Practice natural lawn care** Start with low lawn – put turf only where needed. “Graze/cycle” (mulk/mow), and proper mowing height, watering and fertilization techniques can save time and money.

Natural Yard Care
Five steps to make your piece of the planet a healthier place to live.



King County **City of Seattle** **Living Water Partnership**



Cistern Maintenance



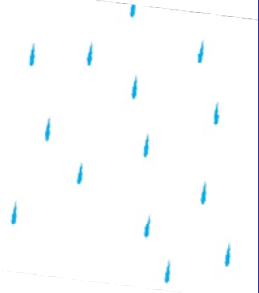


Goal

Keep the water flowing
through to where you
want it.



What would you clean here?





And here?





Cleaning for the
obsessive
compulsive





Top to Bottom Orientation

- Make sure your client knows about maintaining and cleaning gutters
- Leaf diverter or screen kept clear
- End of season check for algae and sediment: clean as needed
- Check valves and orifices
- Check condition of soaker hose and replace as necessary.



Seasonal Driving Instructions



- August: Inspect and clean
- **September: Open your low flow orifice**
- September-April: Visual inspection weekly
- **Tax time: Shut your low flow orifice**
- April-August: Visual inspection.
- Rinse and repeat



Questions?