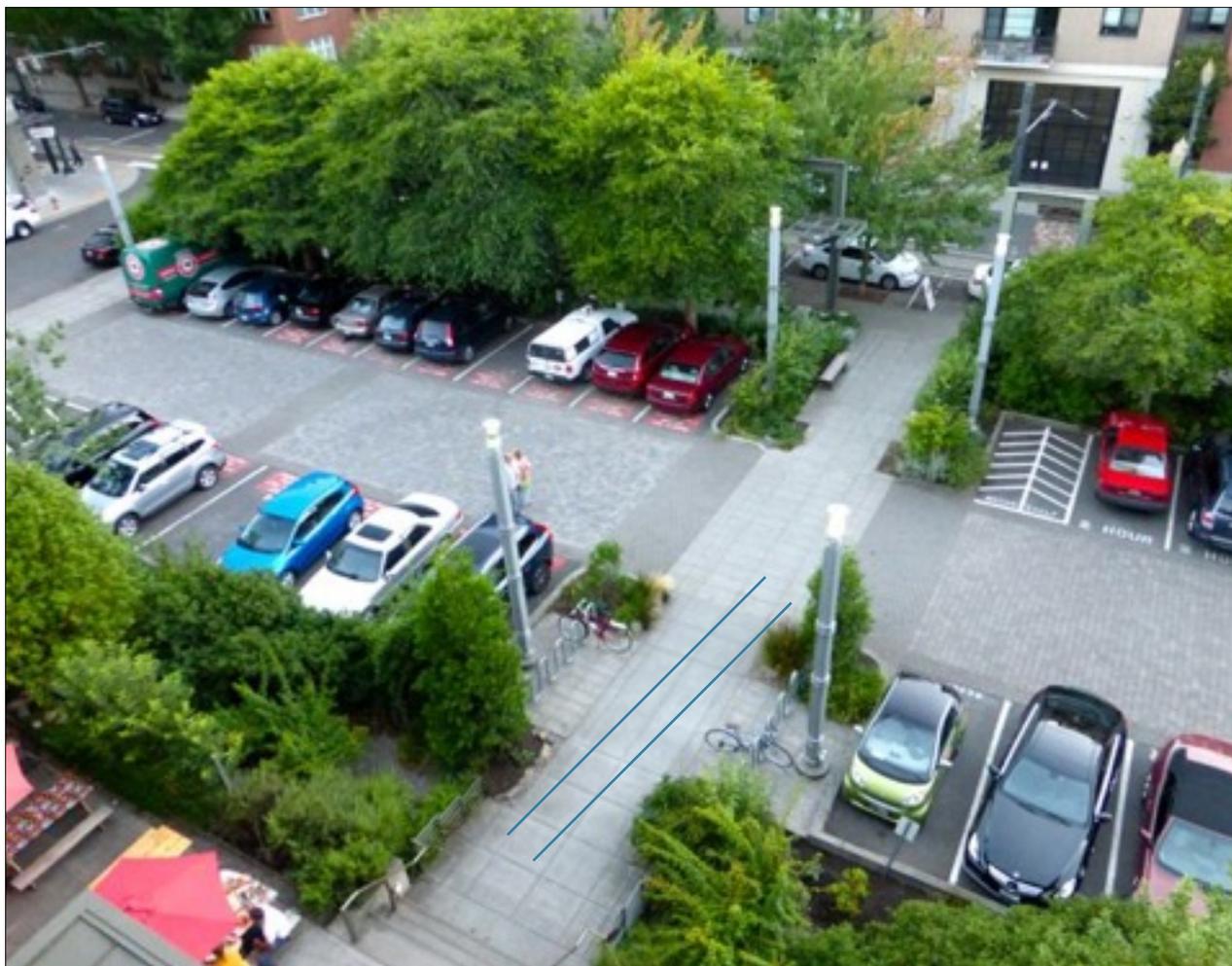


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EcoTrust "Spongy" Parking Lot in Portland, Oregon

Mycoremediation and Surface Parking Lots

**PREPARED BY: MARY VOGEL OF PLANGREEN
NOVEMBER, 2015**

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Portland's Old Town China Town neighborhood has an abundance of surface parking lots. In fact, it has far too many to be a vibrant neighborhood much less an expression of the eco-city that Portland purports to be. I've joined with five other professional women to try to change that. If we can't see these central city lots immediately redeveloped to higher and better uses that house people and businesses, we at least want to see them become better parking lots—SPONGY PARKING LOTS.

My friend, Ruth Ann Barrett coined that term and even made a video about Spongy Parking Lots to share with her neighbors in Old Town/Chinatown. She has friends who visit from California and she's embarrassed to show them how much we waste water here in Portland. When it rains, the water from those parking lots heats up and captures whatever pollutants vehicles leave behind on its way to the nearest storm sewer. The surface parking lots are paved in asphalt and are major contributors to the urban heat island effect that raises the temperature as much as 10° over areas with open land and vegetation. In turn, the extra heat increases the energy needed to cool interior spaces, and puts an extra strain on the grid by exacerbating peak energy loads and hence carbon footprint/climate change. It also contributes to smog formation adding even more public health impacts resulting from excessive outdoor temperature.



We'll return to all that in a moment, but I first want you to recall walking on a trail in the woods where your feet just seemed to bounce on the earth beneath them. That's because that soil was kept porous and, yes, spongy, by the mycelium forming a thick mat that was turning wood to soil under your feet. Those mycelium have fruiting bodies that we call mushrooms—which may or may not be visible during your walk.

Spongy trail in an old growth forest. Photo by PlanGreen

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The white stuff in this photo is mycelium. It will spread throughout the log and ultimately decompose it—creating spongy soil. Photo by PlanGreen.

That mycelium looks a bit like a very dense spider web criss-crossing to create quite a network. It gets its nutrition by decomposing the cellulose in the log. The ability of mycelium of mushrooms in the category of “white rot fungi” to decompose cellulose is related to their ability to decompose numerous other substances as well: bacterial toxins such as e-coli and fecal coliform as well as polycyclic aromatic hydrocarbons(PAHs). Research also shows their ability to transform bunker fuel oil, explosives, polychlorinated biphenyls (PCBs), and organochlorine pesticides—substances we hope we won’t find in OTCT parking lots.



We do have models for Spongy Parking Lots nearby. My favorite is at the Jean Vollum Natural Capital Center (a.k.a Ecotrust) in the adjacent Pearl District neighborhood. It is pictured on the cover. Often on a summer day, the cars are kicked out of this pleasant parking lot for an array of fairs, festivals and farmers’ markets. If you enlarge this photo, you will see that the lot is paved with light colored porous pavers and that those trees are planted in bioswales that also hold an array of mostly native plants. You will see that the parking spaces drain into those bioswales. which are about 2.5 feet deep. Not only do the soils and plants in the bioswales infiltrate the water from the parking lot within 24 hours, they also cool the water and filter the pollutants that come from our vehicles and pets.

Sediment
Minimum of 3
1 per fiscal year
Treatment facility
Composite
•Total Solids
•Grain Size
•HCID/TPH
•Total Metals (Cd, Cr, Cu, Pb, Hg, Zn)
N/A

BES Sediment Testing Chart

HCID-TPH is a screen to determine the presence and type of petroleum products that may exist in water or soil. Table from BES 2010 Stormwater Monitoring Report referenced below.

What could be better? Well, Portland monitors the effectiveness of its bioswales and some of the latest soil sampling data¹ shows that E-coli and heavy oil results were variable, but levels were higher than the background soil sample sites located nearby but outside of the stormwater facilities. Metal and PAH levels found in stormwater facilities were generally similar to those found in background sample soils. While these results show that soils in bioswales are likely taking up E-coli and heavy oil from runoff that would otherwise go down a storm drain, soil results could be **CLEANER THAN THE BACKGROUND SAMPLES** in all categories tested: E-coli, heavy oil, metals and

PAHs.

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If mycelium running through the bioswale made the soil spongier and more absorbent and if those same mycelium could help the plants thrive by “eating” more of the pollutants, then I maintain we would have an even spongier parking lot. A spongier parking lot could better utilize and clean the water running off it into bioswales.

As its trees and plants grow better with less pollutants in its soil, the spongier parking lot will decrease the urban heat island effect even more and become an important strategy for both mitigating and adapting to climate change.

I hope you will read my previous three short blogs on mycoremediation/mycofiltration at <http://plangreen.net/blog>) to better understand the technology I am proposing. I plan one more mycoremediation blog on monitoring.

¹Bureau of Environmental Services • City of Portland 2010 Stormwater Management Facility Monitoring Report



Mary Vogel, Principal of PlanGreen has over 20 years experience in bringing sustainability concepts into urban planning and design.

She is active in shaping the re-write of the City of Portland’s Comprehensive Plan to help it connect people to nature. She also works with the Portland Downtown Neighborhood Association to help make Portland’s downtown more resilient, climate smart and livable. Mary helped found a regional chapter of the Congress for the New Urbanism in the Pacific Northwest (OR, WA & BC). At the national level, she has been involved in CNU’s Light Imprint New Urbanism Initiative and its Transportation Task Force helping to develop a context sensitive manual for transportation engineers in partnership with the Institute for Transportation Engineers. As a member of the Correspondence Committee for LEED ND (Neighborhood Development), Mary helped to develop that rating system.

Contact Mary by email: mary@plangreen.net
