SOURCE TO STREAM 2025 Conference

Canada's Premier Stormwater and Erosion and Sediment Control Conference

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HOSTS

Presented by:

Toronto and Region Conservation Authority

In association with:

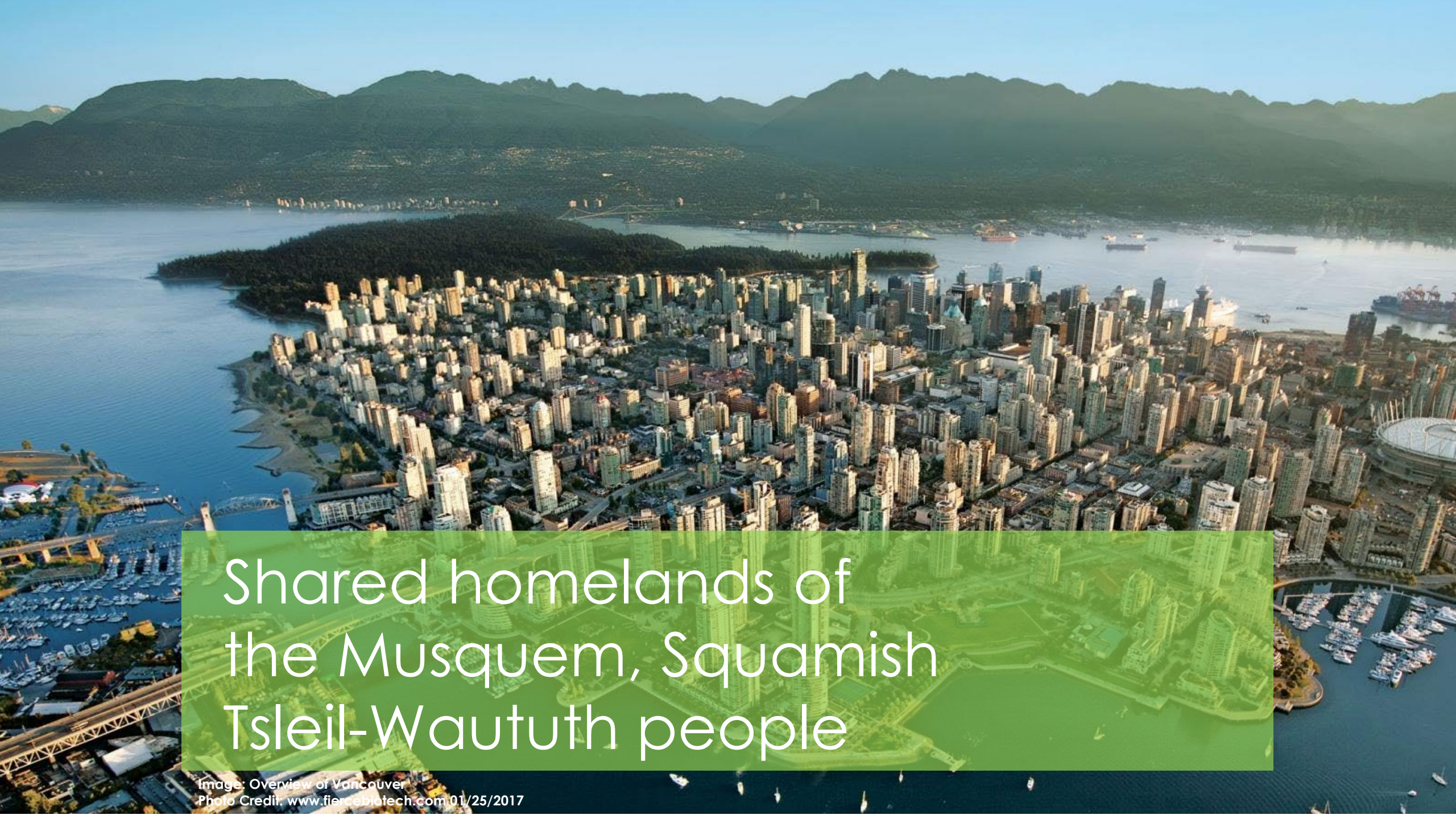
Lake Simcoe Region conservation authority
Credit Valley Conservation – inspired by nature

Designing for longevity in Green Infrastructure: Urban Ecology and Community

Bioretention in Vancouver

CITY OF VANCOUVER

Sheri DeBoer
Source to Stream 2025

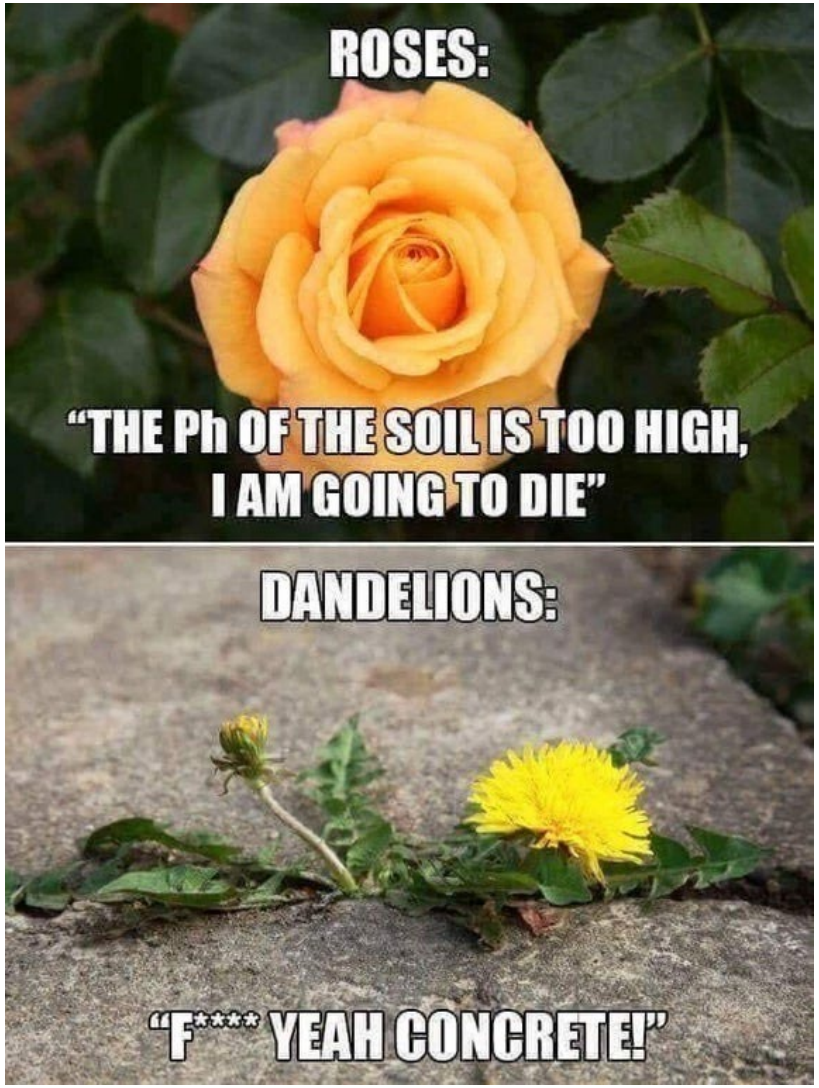


Shared homelands of the Musquem, Squamish Tsleil-Waututh people

Image: Overview of Vancouver
Photo Credit: www.fierceblotech.com 01/25/2017


Bioretention Ecological Connection
Erosion control
Urban Cooling
Ecosystem connectivity
Community Health
biodiversity
Habitat
Soil stabilization
Sense of place
Soil Food Web
POLLINATION
Pollutant Absorption
Soil Moisture
Water Filtration
Indigenous cultural meaning

There is No Perfect Plant



Planting Decisions

We choose based on:

Micro Climates

Inputs – (matrix, soil chemistry)

Ecological Benefit (connectivity, pollination and habitat)

Function (slope stabilization/water management, habitat)

Community engagement

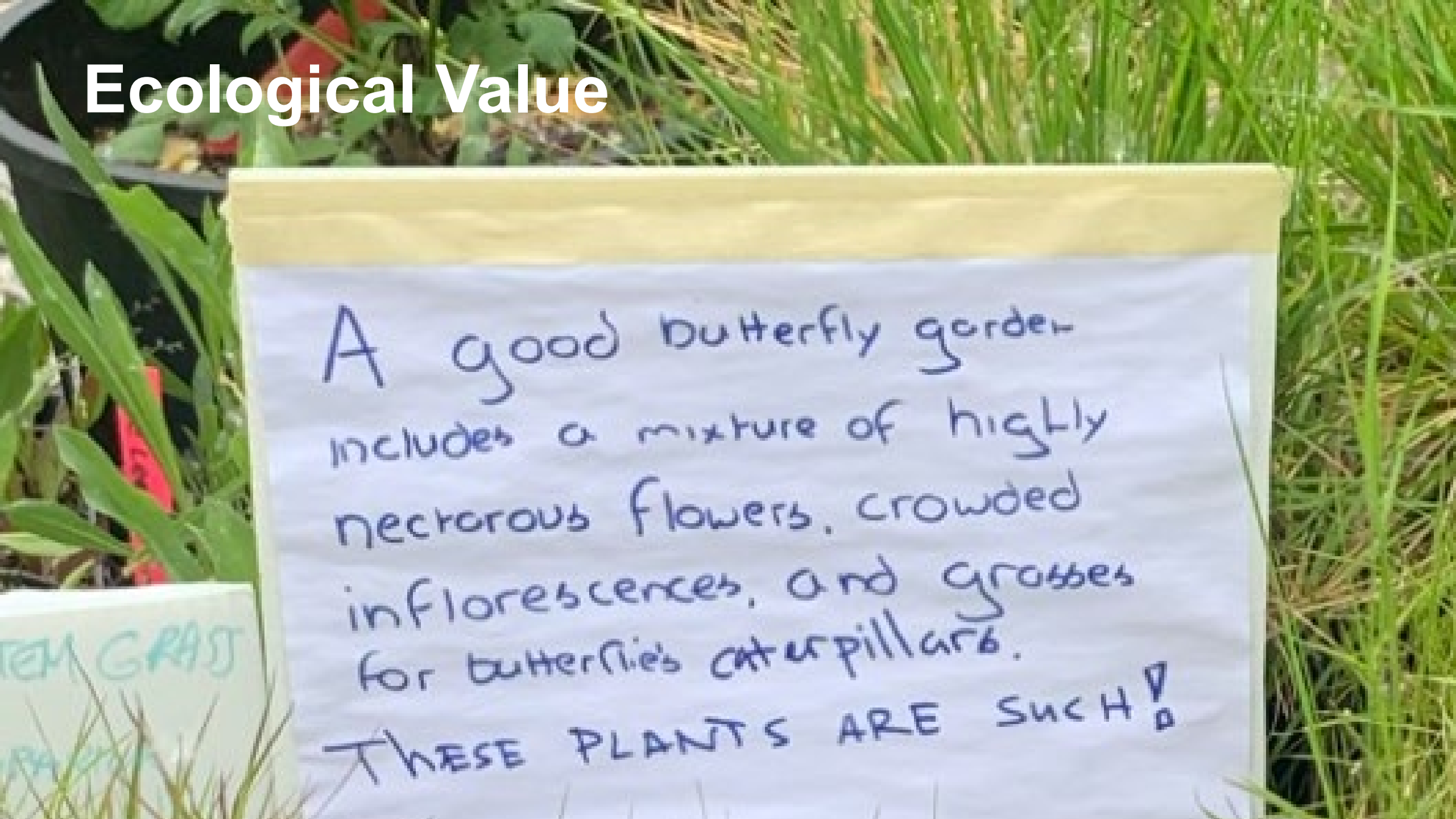
Level of Maintenance

we are striving for ecological strategies that will ensure our systems provide cross the board benefits and will survive beyond 25 years

Planting Communities for longevity and habitat

Image: Haro Street Bioswale
Photo Credit: Sheri DeBoer

Ecological Value

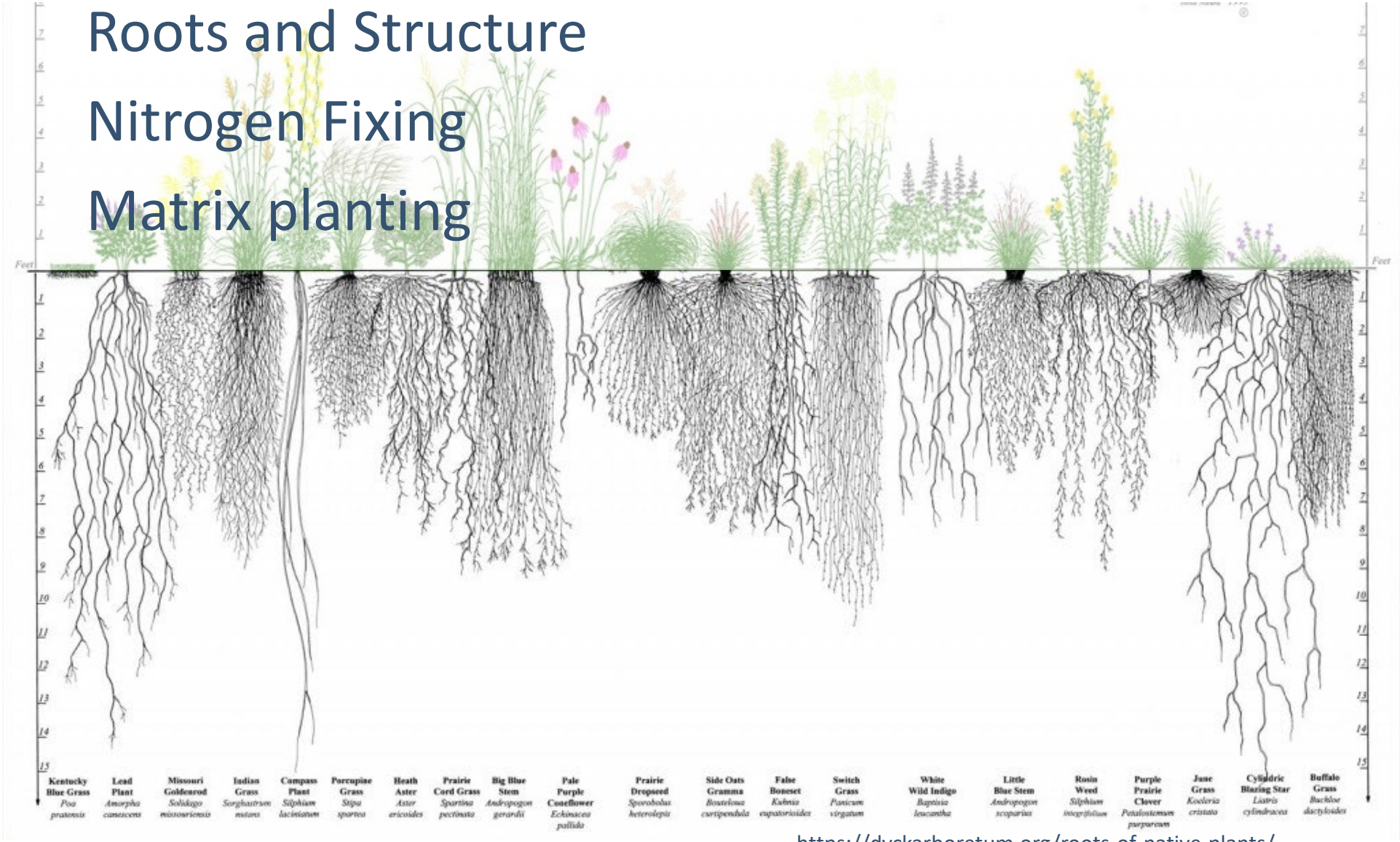


Biodiversity and Blooms

ype		Common Name	Scientific Name	Height	Native	Sun	Shade	January	February	March	April	May	June	July	August	September	October	November	December	FOOD	Bumble Bee	Mason Bee	Western Bumblebee	Spotted Towhee	Red Admiral Vanessa	Western Tiger Swallowt	California Tortoiseshell	Anna's Hummingbird	CWH Zone	Ethnobo
		Arp Rosemary	*Rosmarinus officinalis 'Arp'*	*90-120*	*y*																									x
		Salal	*Gaultheria shallon*			◐	◑																							x	
		Red flowering Current																													
		Azalea																													
		Nootka Rose	*Rosa nootkana*		*y*	◐	◑													x											
		Oceanspray	*Holodicus discolour*		*y*	◐	◑													x											
		Oregon Grape	*Majonia nervosa*			◐	◑													x											
		Sword Fern	*Polystichum munitum*			●	◑													x										x	
		Bracken Fern	*Pteridum aquilinium*			◐	◑																							x	
		Kinickkinnick	*Arcotstaphylos uva-ursi*			●	◑													x											
		Snowberry	*Symphoricarpos*			◐	◑													x											
		Heather	*Calluna*			◐	◑													x											
		Rhododendron	*Rhododendron*			◑															x										
		Blueberry	*Vaccinium Ovalium*	*100-300*		◑	◑														x										
		Black Huckleberry	*Vaccinium ovatum*			◑	◑																								
		Red Huckleberry	*Vaccinium parvafolium*	*100-300*		◑	◑																								
		Wild rose	*Rosa (nootkajpisocarpa)*	*100-300*	*y*																	x	x								
		Trailing Blackberry	*Rubus ursinus*	*300-600*	*y*	◑	◐															x	x		x						
		California Lilac	*Ceanothus*	*200-250*	*y*	◐																	x			x			x		
		Willow	*Salix purpurea*	*100-299*			◑																		x		x				
		Red huckleberry	Vaccinium parvifolium			◐	◑																							x	
		Vine maple	Acer circinatum			◐	◑																							x	
		Ceaothus																													
ees																															
	Cn	Nootka Cypress	Chamaecyparis Nootkatensis	*6m-10m*	*y*	◐	◑																								
	Rs	Red Floweing Currant	Ribes Sanguineum	*150-360*	*y*	◐														x											
	Rb	River Birch	*Betula nigra'Heritage'*	*multi ste*	*y*																										
		Amelianchier canadensis	Service berry																												
		Cascara	Rhamnus purshiana																											x	

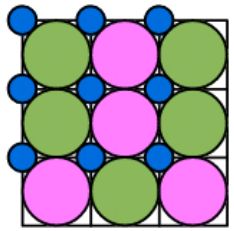
Plant Science

- Roots and Structure
- Nitrogen Fixing
- Matrix planting

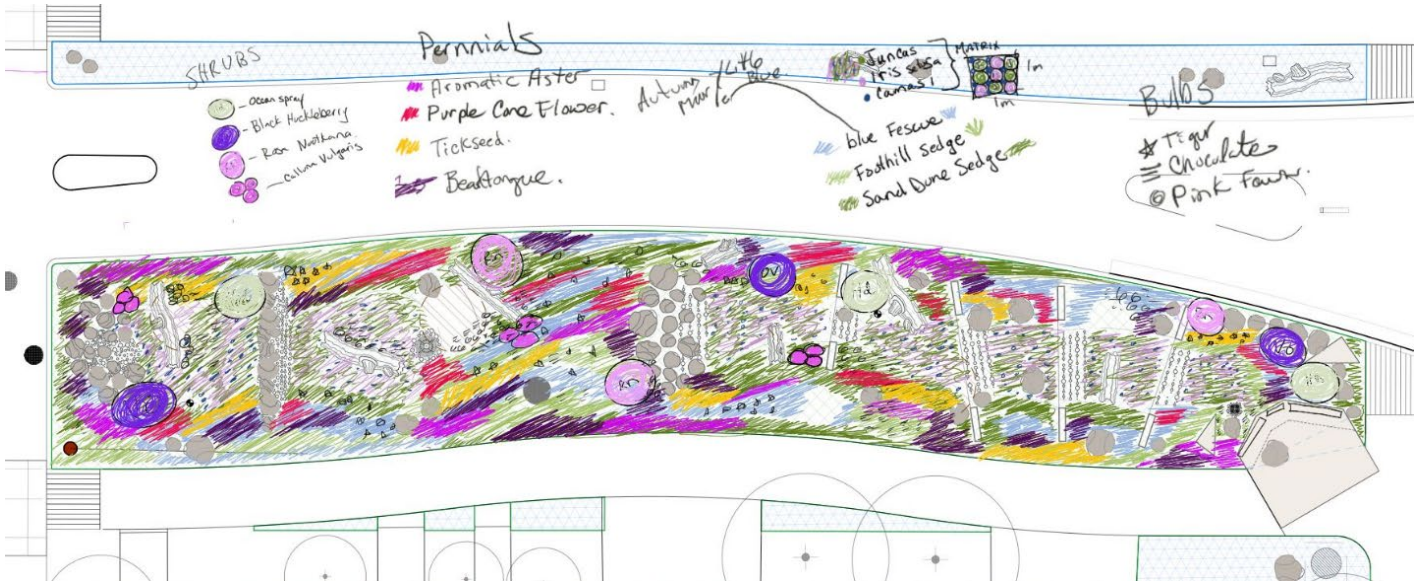


https://dyckarboretum.org/roots-of-native-plants/

Planting Plans



Matrix



Ethnobotany

Plant Guilds – know what plants grow well together for structure and form below ground relationships

There are good plants with a bad wrap

Nurture the soil and build soil from scratch

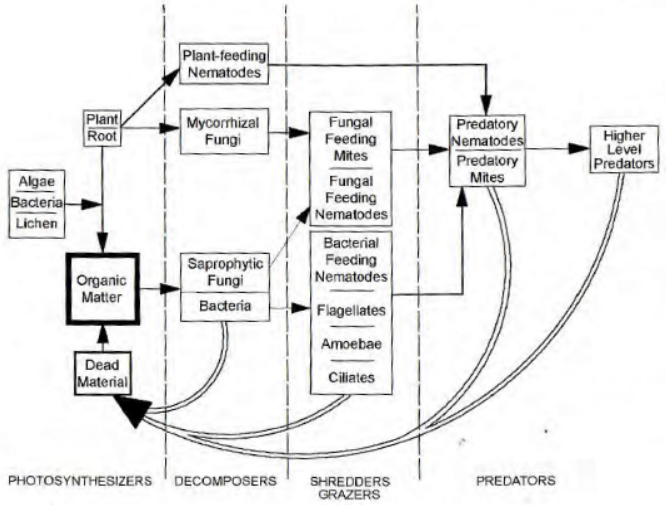
Involve the community and find stewards of the rain garden

Cycles

"Despite all our accomplishments, we owe our existence to a six-inch layer of topsoil and the fact it rains" Paul Harvey

So many Cycles at Play

Table 1.3.1. The soil food web. Organic matter moves through the food chain, gradually increasing the complexity and stability of carbon compounds, and producing rich humus at the end. *(Source: Adapted from Soil Foodweb)*



Soil Food Web

Healthy living soil is full of micro organisms. The web is reliant on continuous flow of decaying organic matter supplied by the trees and plants[1].

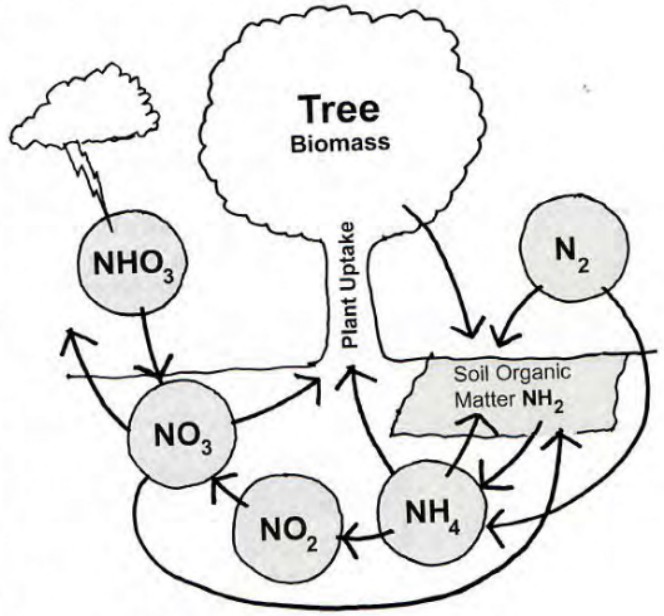


Figure 1.4.3. Nitrogen cycle.

The Nitrogen Cycle

Soil organisms absorb nitrogen from the atmosphere and organic matter to become absorb-able by the plant roots[1].

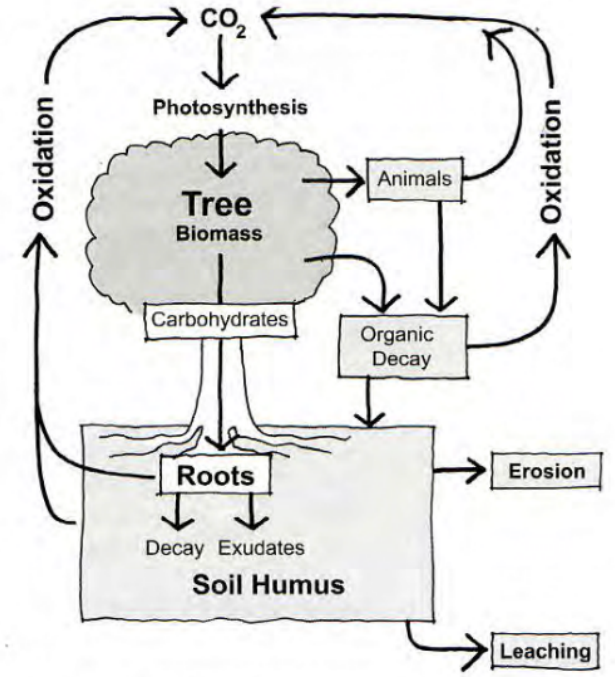


Figure 1.3.3. Carbon cycle.

The Carbon Cycle

Carbon is the building block of all life forms and is provided to the soil through decaying plants. It feeds the soil organisms[1].

Graphic Retrieved By Up By Roots, 2008

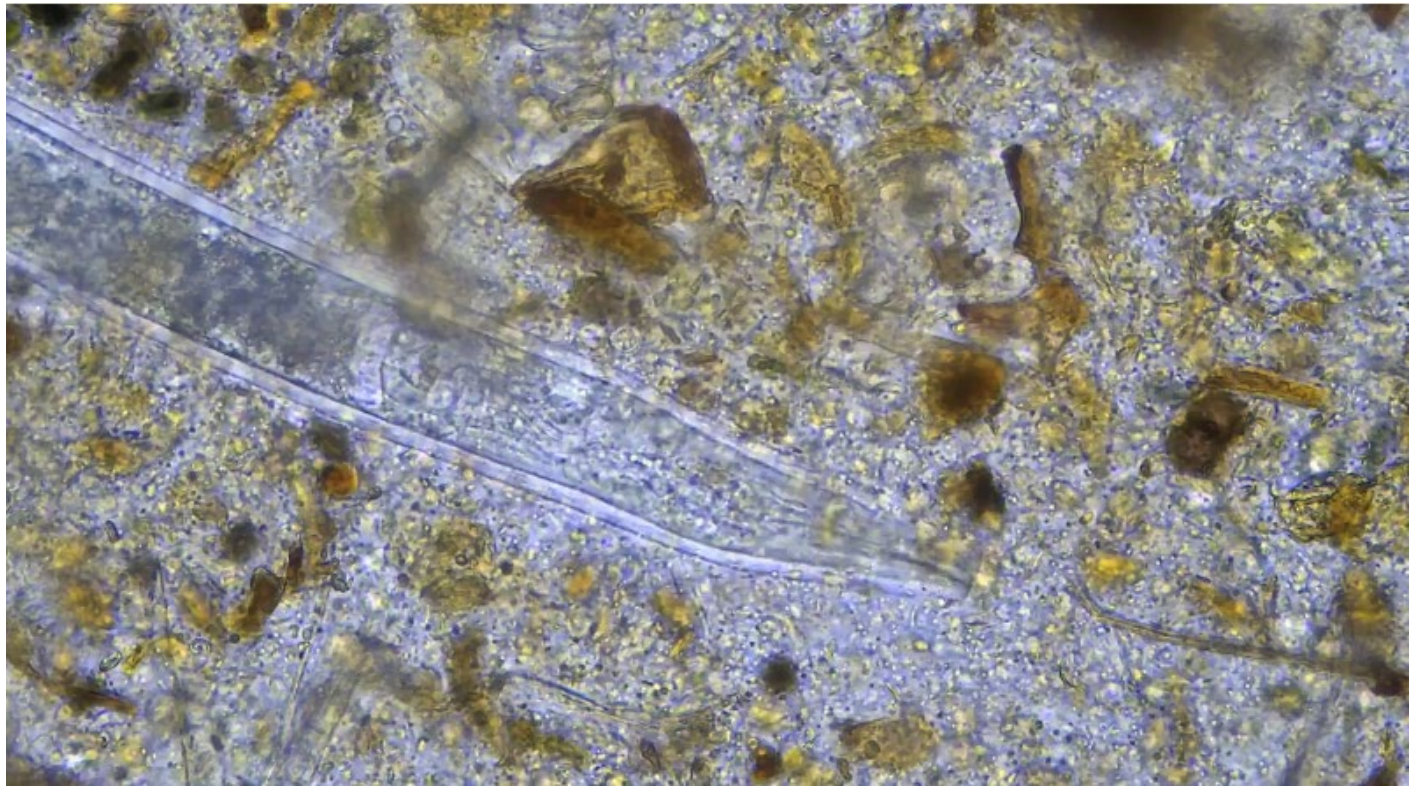
Soil

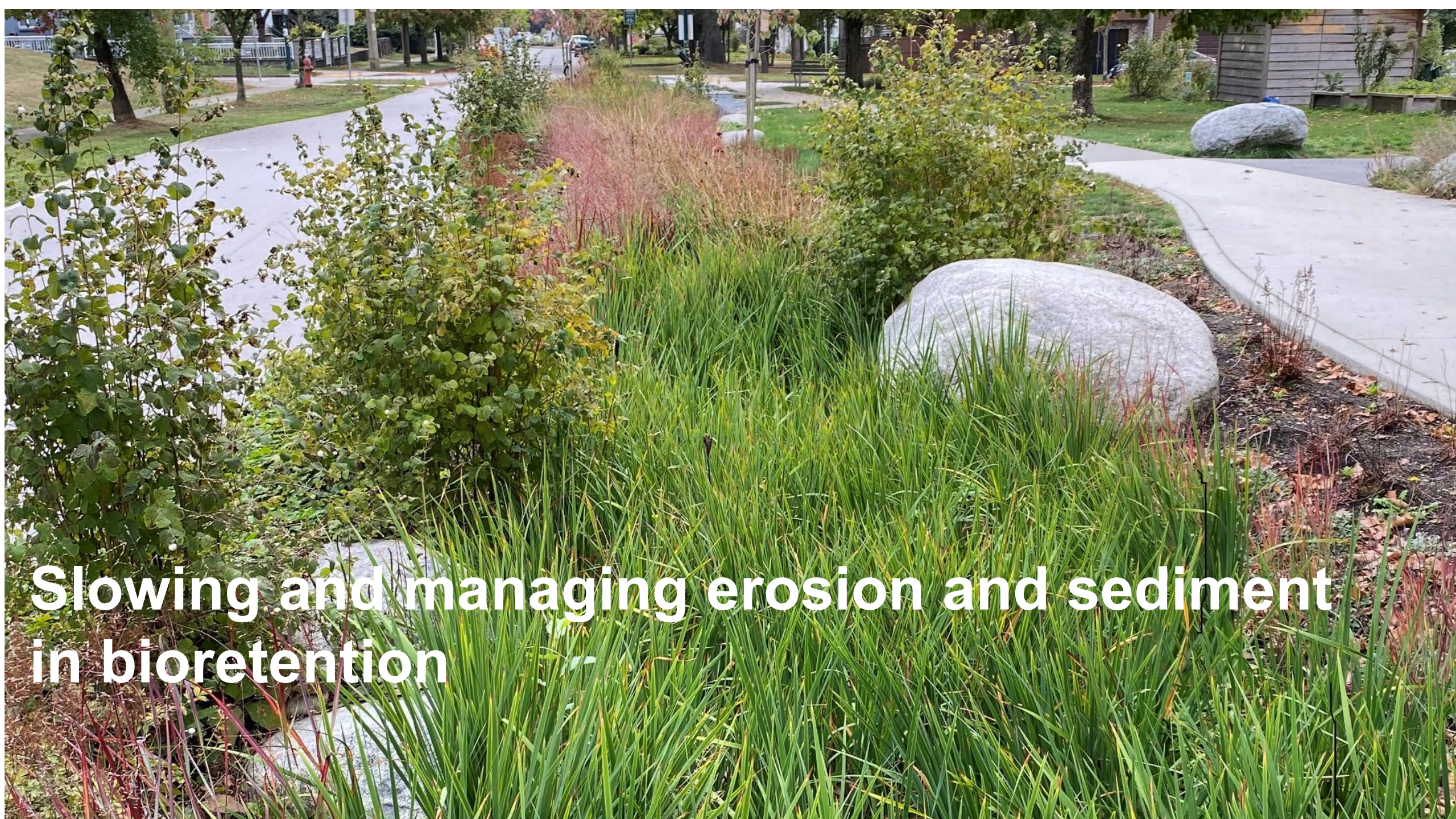
“The nation that destroys its soil destroys itself.” Franklin Roosevelt

Soil Reports

- pH
- Salinity
- Nutrients and Fertility
- CEC
- Texture
- Organic Matter

Soil Inoculation

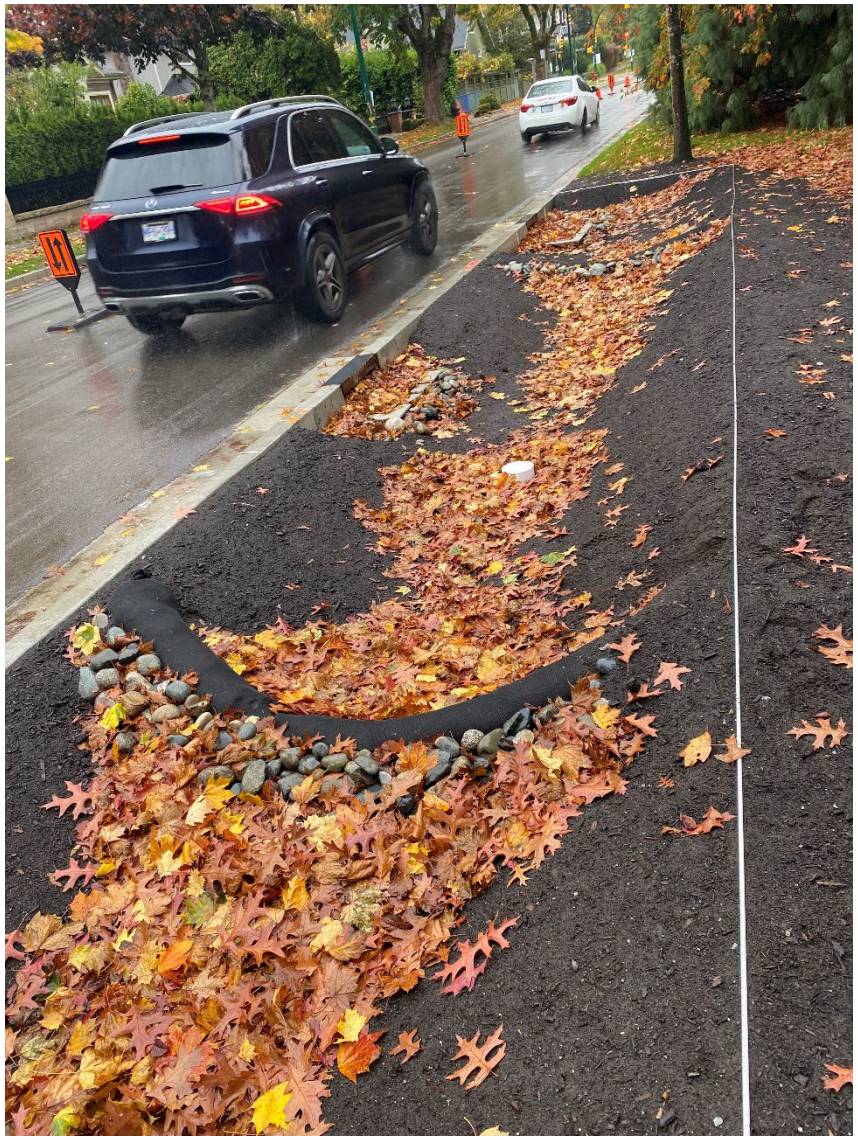




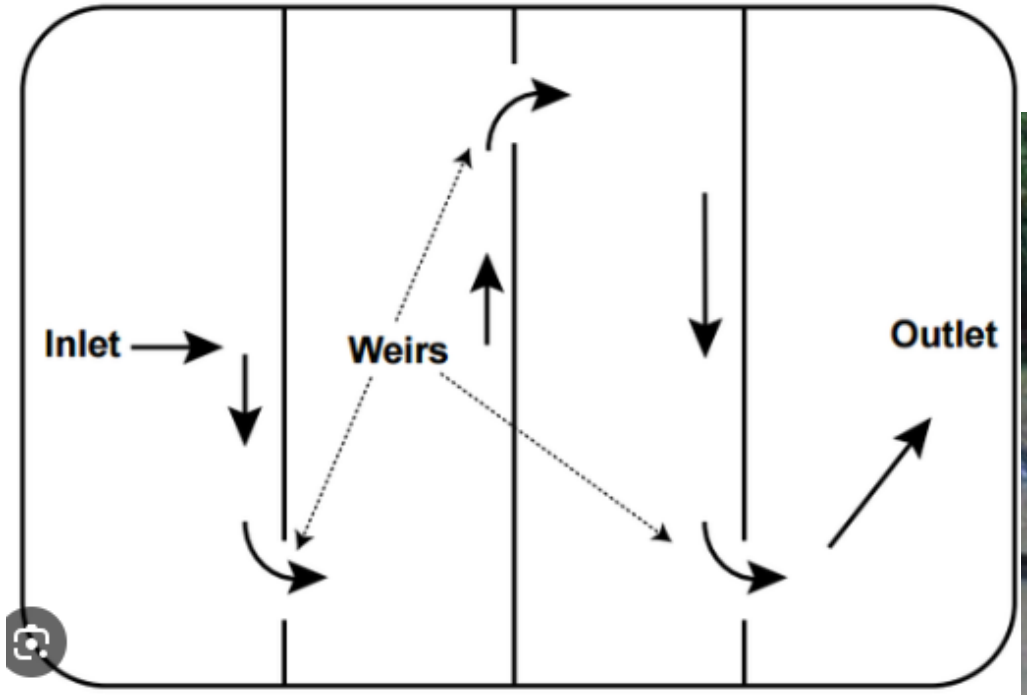
Slowing and managing erosion and sediment in bioretention

Socks in ESC

Socks in GI



Baffles in Settling Ponds

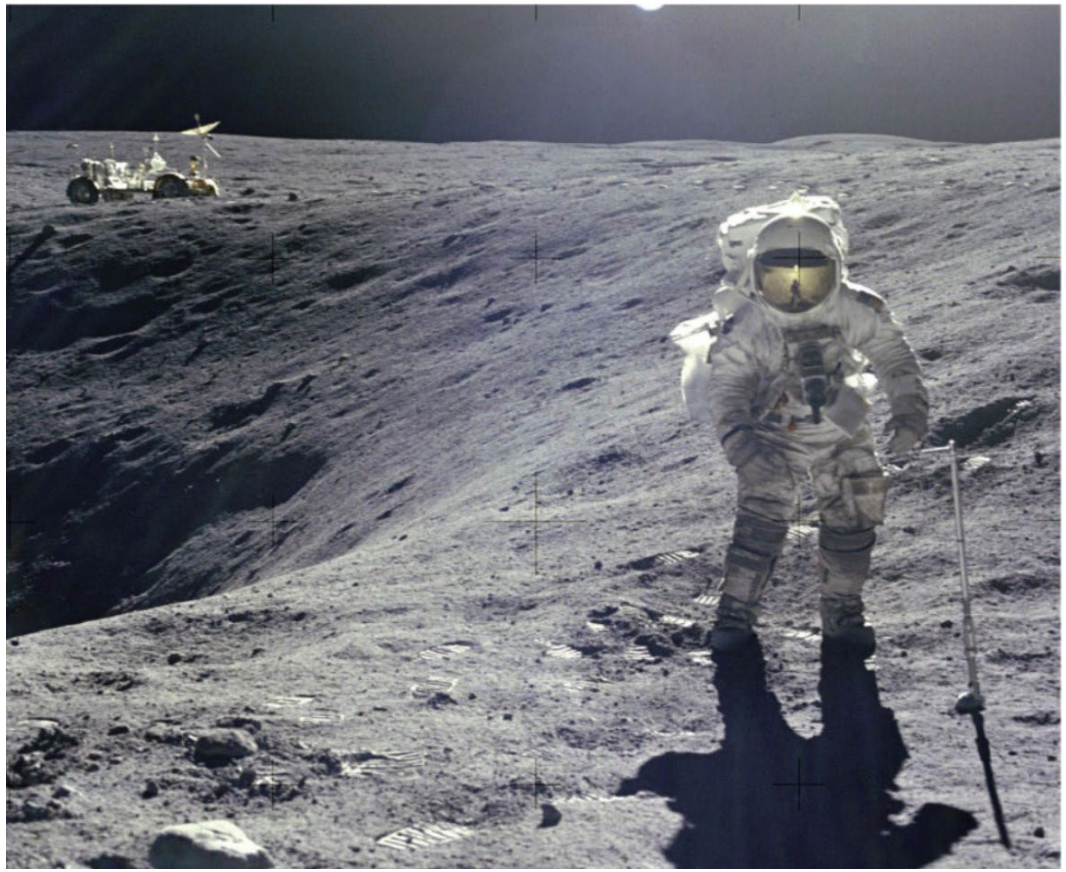


Sedi Pad Baffle

Woody Debris

Maintenance and Management

The ultimate “no-maintenance” landscape 😍



Maintenance

The added stressors and benefits within our bioretention systems cause for higher level of care:

Sediment

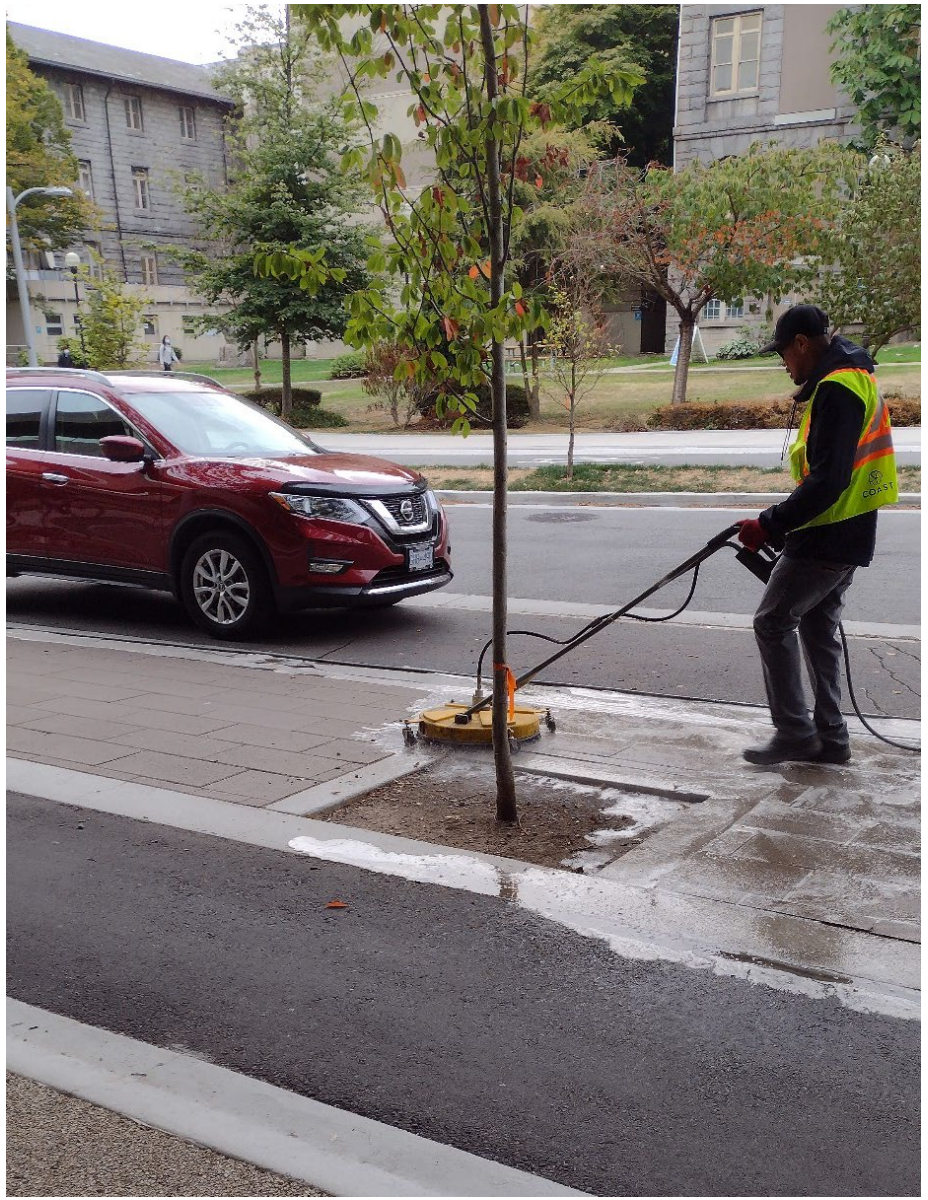
Water

Pollutants

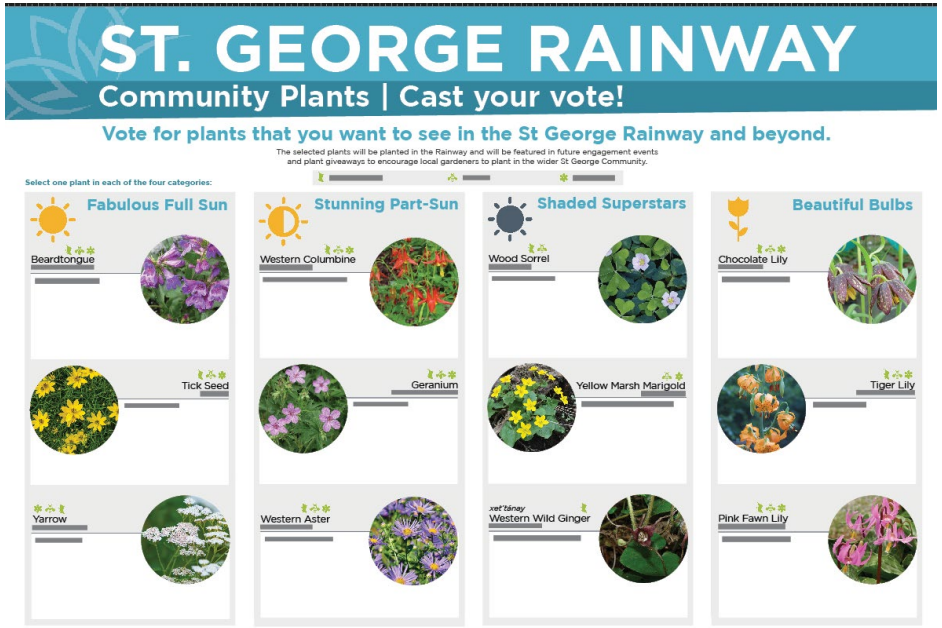
Social Enterprise Procurement

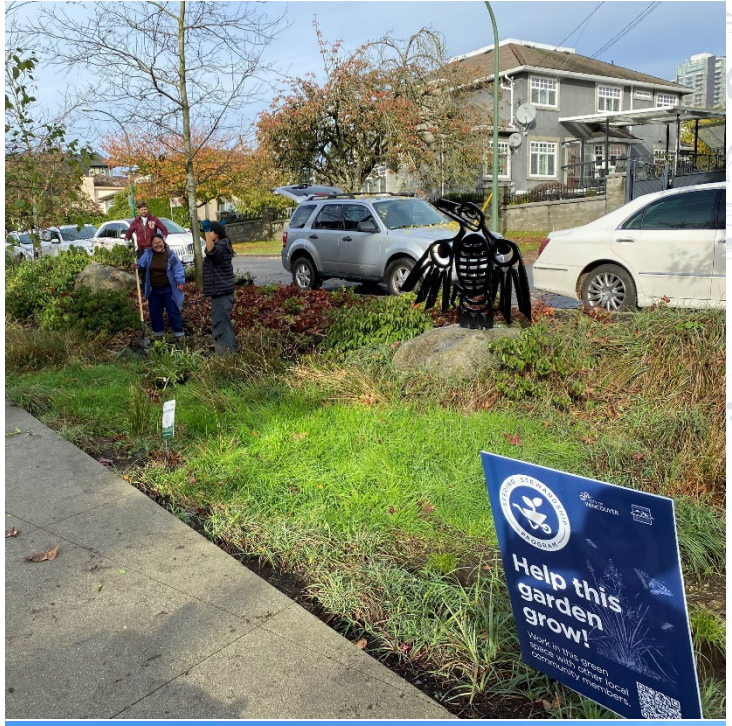
Landscaping with Heart

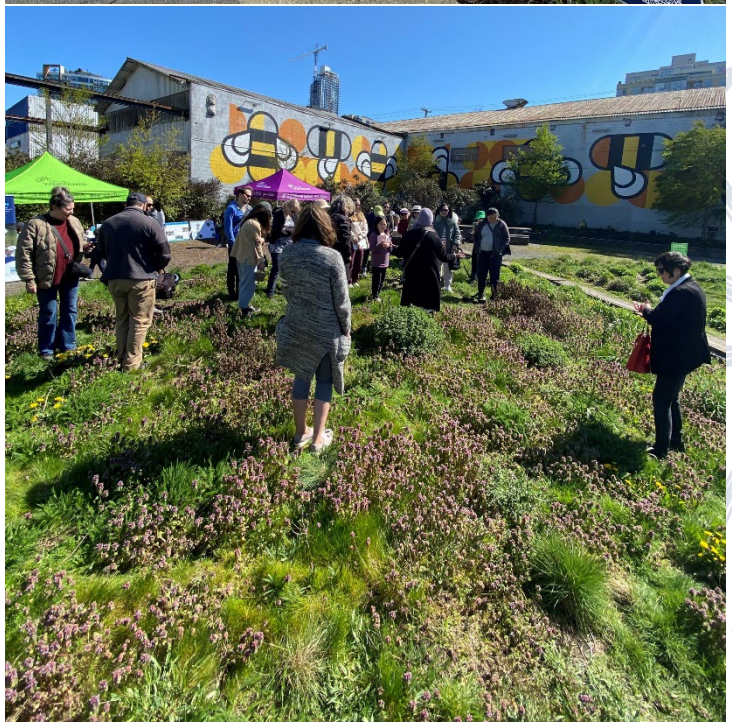
- Reactive inlet maintenance
- Sediment clearing
- Pressure washing
- Cost effective means of activating low skilled work



Public Engagement







SEEDING STEWARDSHIP PROGRAM

Seeding Stewardship is a new community support program which empowers community champions to connect with the nature-based solutions in their neighbourhood. Support is provided by joint efforts from the City and Parks through access to tools, knowledge, and in-kind resources.

This program focuses on providing opportunities for connection to land, water, and community through stewardship.

Seeding Stewardship Sites

We humbly acknowledge that the City of Vancouver is on the unceded ancestral territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Peoples who have stewarded this land since time immemorial

Monitoring and Site Evolution

Understanding system performance allows for continual improvement

Much like a natural system, the site will evolve over time.

Image: Pine Street injection Testing
Photo Credit: Sylvie Spraakman

Thank you

City of Vancouver
Planting and Ecology Design Guidelines
For Green Rainwater Infrastructure

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Image: Douglas Asters in the rain garden at 63rd and Yukon in Vancouver
Photo Credit: Wendy de Hoog