



# MEADOWSCAPING

FOR CARBON SEQUESTRATION



# Overview

- What
- Why
- Designing
- Planting
- Maintaining





*“We have to raise the bar on our landscapes. In the past, we have asked one thing of our gardens: that they be pretty. Now they have to support life, sequester carbon, feed pollinators and manage water.”*

Douglas Talamy, Professor  
University of Delaware, 2015

# What is Meadowscaping?

- Nurturing a native prairie / meadow plant community in an urban garden setting
  - Native grasses + Native wildflowers



Natural Willamette Valley Prairie



Meadowscape





# Why convert a lawn?

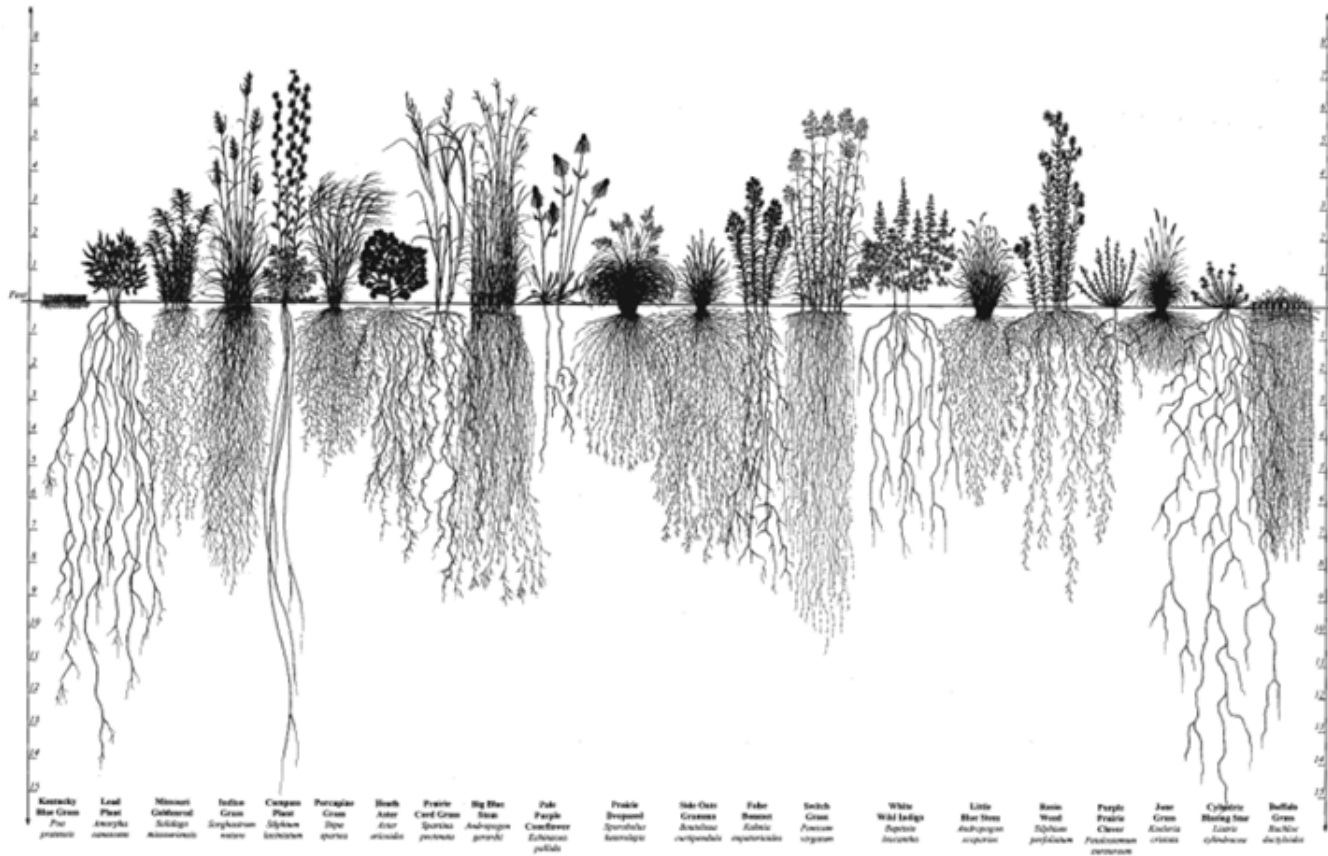
- Sequester Carbon!
- Wildlife & Biodiversity
- Water & Air Quality
- Water Conservation
- Natural Heritage
- Lower Maintenance Options

Andrena (Mining Bee) on Goldfields (*Lasthenia californica*)

Photo: Mace Vaughn, Xerces Society



# Stormwater Management & Carbon Sequestration

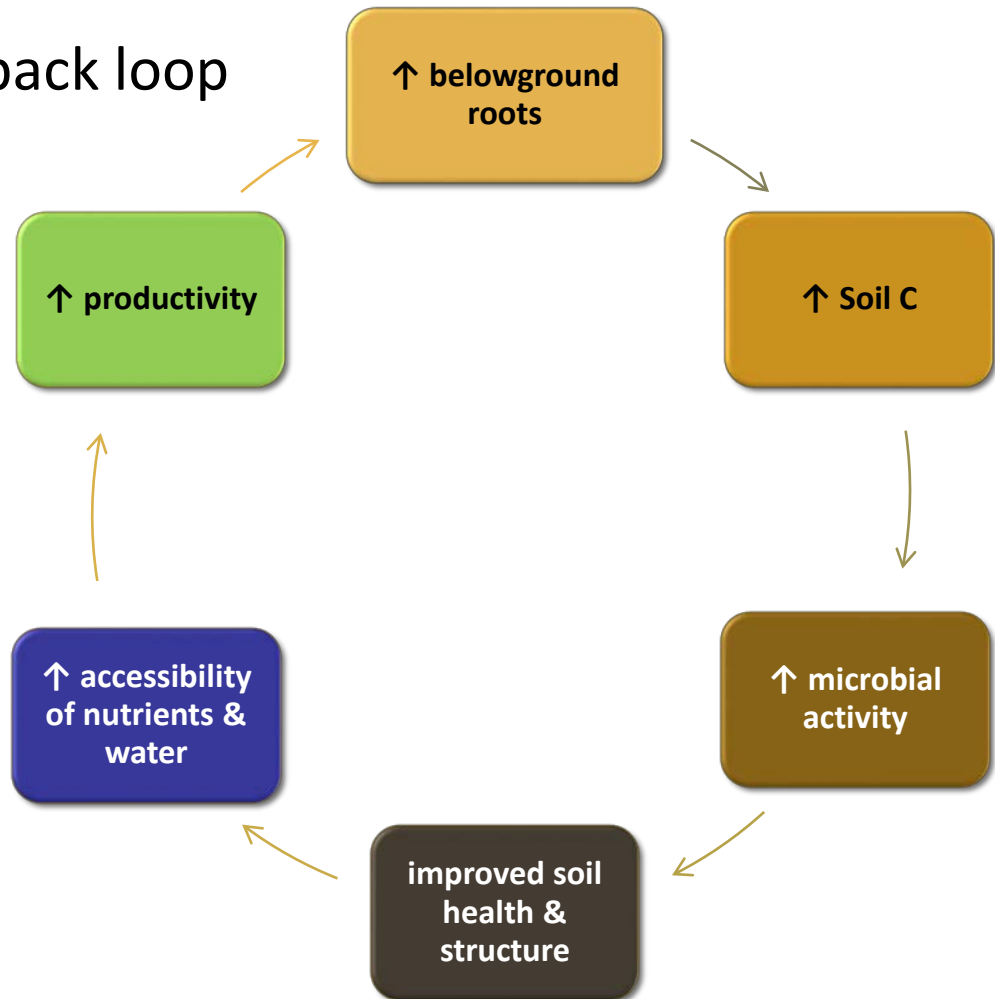


Left: Natural Resources Conservation Service (NRCS) Illinois Native Plant Guide: Root Systems of Prairie Plants.  
Right: Kappuccino on imgur.com



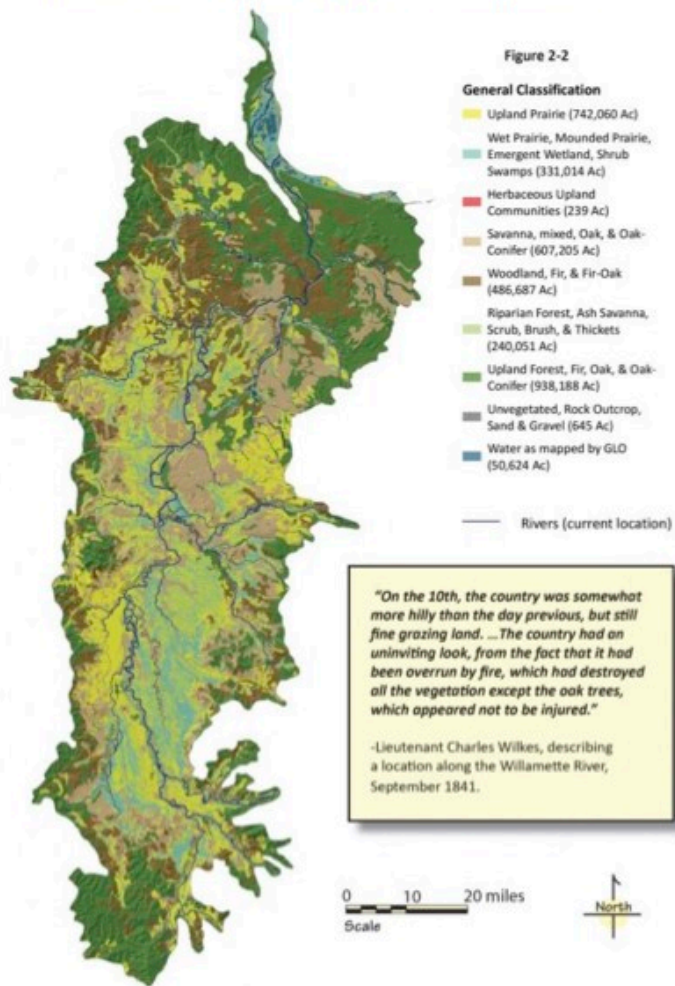
# How Meadows Apes Sequester Carbon

- ↑ Below-ground biomass
- ↑ Microbial-plant feedback loop
- ↓ fertilizer inputs
- ↓ mowing (fuel)

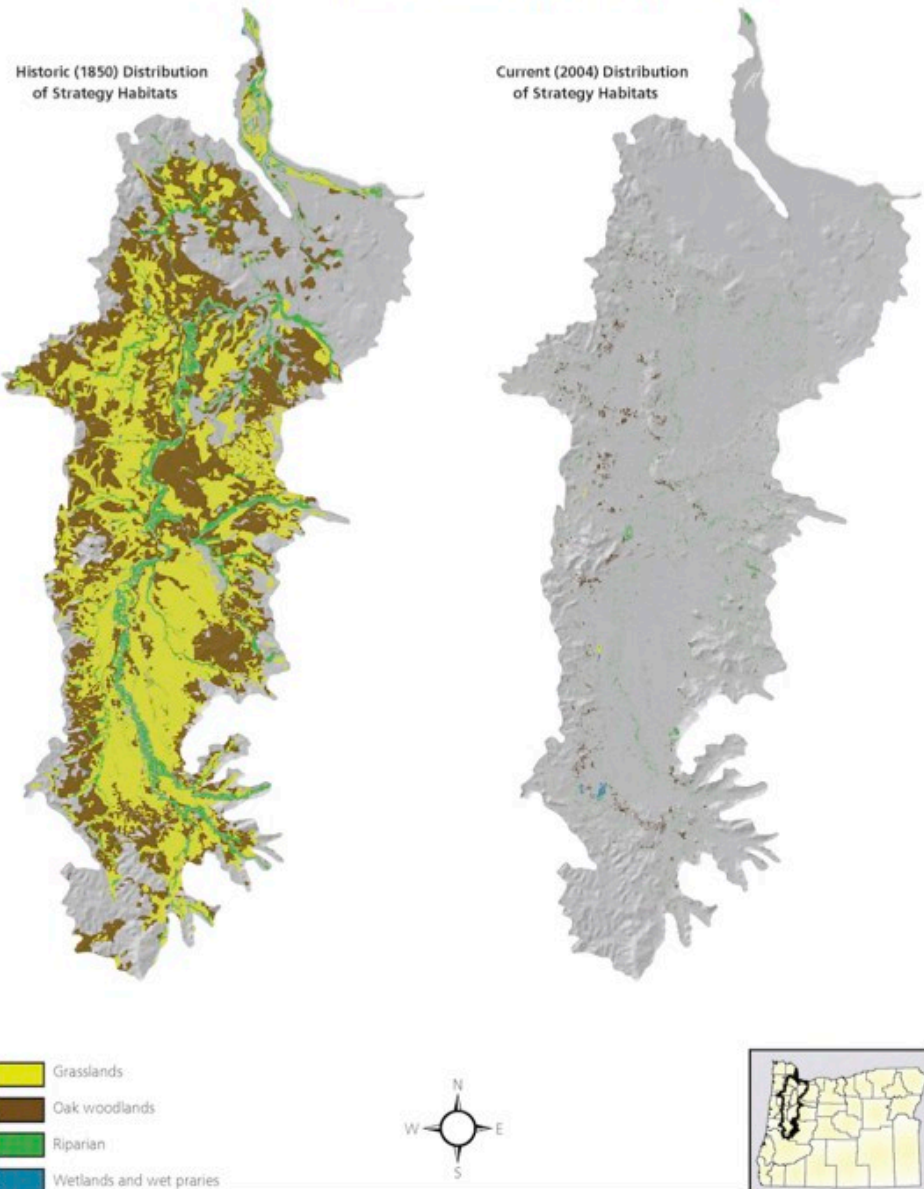




## Willamette Valley Ecoregion 1850 Vegetation



## Change in Willamette Valley Strategy Habitats





# Wildlife Habitat

- Pollinators:
  - Nectar sources
  - Ground nesting sites
  - Overwintering shelter
- Birds:
  - Food
  - Shelter
  - Nesting sites
  - Baby food (insects)

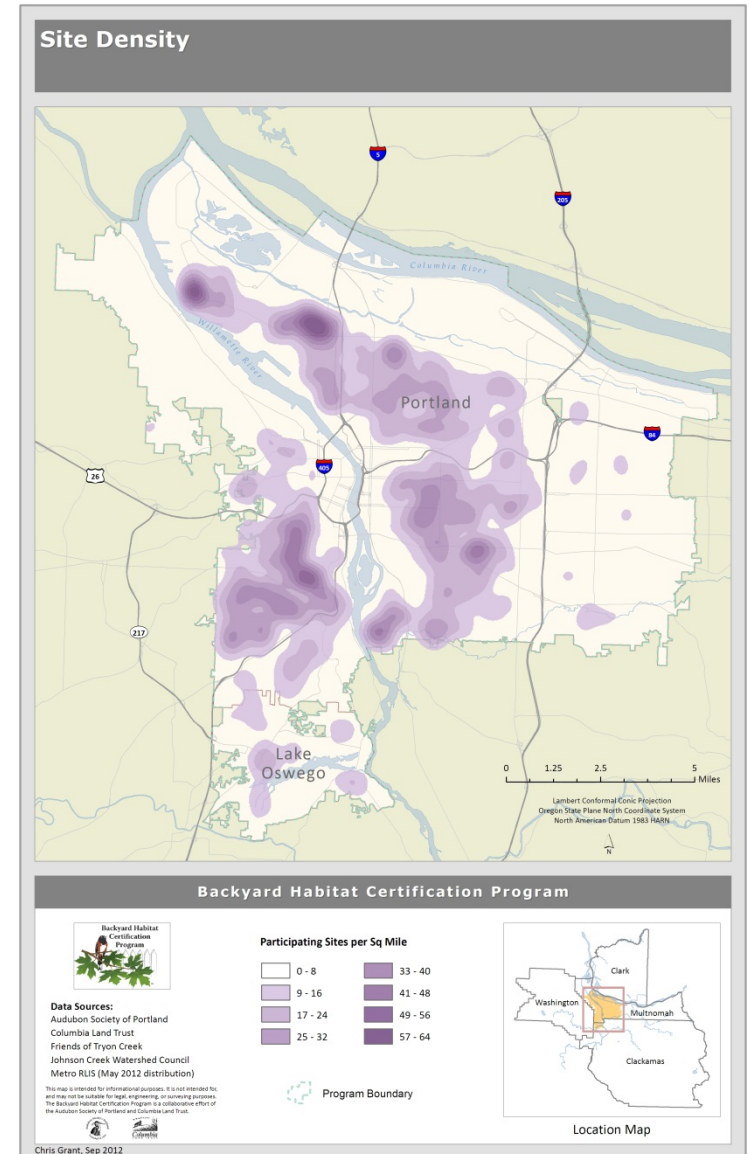


Photos: Laura Taylor,  
WMSWCD

# Habitat Connectivity



Photo: Marissa Aurora Dorais  
Portland Parks & Recreation  
Willamette River Stewardship Coordinator | City Nature





# The Meadowscaping Handbook



**WEST MULTNOMAH**  
Soil & Water Conservation District





Photo credit: Bob Hansen

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# Site Planning

- Project Goals
  - Aesthetics
  - Lower Maintenance
  - Wildlife Habitat
  - Stormwater Treatment
- Project Type
  - Low Lying Groundcover
  - Native Grass Alternative
  - Meadowscape



Photo Credit: Gaylen Beatty, Columbia Land Trust

# Site Planning

- Resources & Constraints
  - Labor
  - Tools
  - Materials
  - Budget
- Inventory & Analyze Site
  - Slope
  - Shade
  - Weeds
  - Pressures
  - Human Needs
  - Soil Type & Moisture



Photo: Mary Logalbo



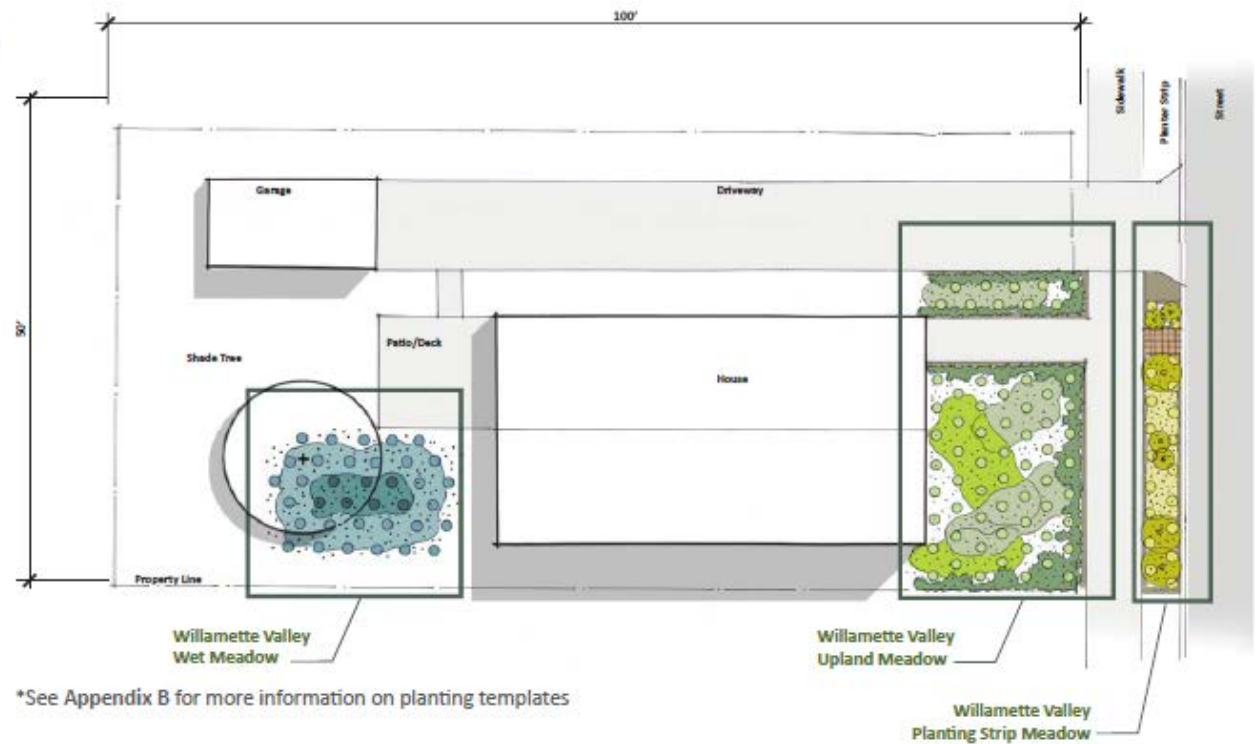


# Consider unused spaces...



Photo: Bob Hansen, Corvallis

## WILLAMETTE VALLEY MEADOW ZONE PLANTINGS





# Pilot Meadowscape in Unused Space



Photos: Zarnoch, Portland Urban Meadows Pilot Participant



# Heavy Use Areas



Photo: [mulya.org](http://mulya.org)



## PERSPECTIVE SKETCH OF URBAN MEADOW DESIGN TEMPLATE LOCATIONS



# Project Design



- Choose appropriate & available plants  
<https://wmswcd.org/types/native-plants/>
- Consider 3 Bloom Times & 1 Bunchgrass
- Careful of bullies!

Flower Species - common name ( <i>scientific name</i> )	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
western buttercup ( <i>Ranunculus occidentalis</i> )			yellow					
shooting star ( <i>Dodecatheon hendersonii</i> )			pink					
western trillium ( <i>Trillium ovatum</i> )			white to purple					
meadow checkerbloom ( <i>Sidalcea campestris</i> )			light pink					
woodland strawberry ( <i>Fragaria vesca ssp. Brachteata</i> )			white to pink					
Oregon iris ( <i>Iris tenax</i> )			purple					
camas ( <i>Camassia leichtlinii</i> or <i>quamash</i> )			blue					
western columbine ( <i>Aquilegia formosa</i> )			red					
fringecup ( <i>Tellima grandiflora</i> )			greenish-white to reddish					
varileaf phacelia ( <i>Phacelia heterophylla</i> )			white					
lance selfheal ( <i>Prunella vulgaris</i> )					purple			
slender cinquefoil ( <i>Potentilla gracilis</i> )					yellow			
harvest brodiaea ( <i>Brodiaea elegans</i> )					purple			
salebroso goldenrod ( <i>Solidago canadensis var. salebroso</i> )					yellow			
Bunchgrass Species - common name ( <i>scientific name</i> )	Height at maturity (ft)							
blue wildrye ( <i>Elymus glaucus</i> )	3							
California brome ( <i>Bromus carinatus</i> )	3							
tufted hairgrass ( <i>Deschampsia caespitosa</i> )	3							
Roemer's fescue ( <i>Festuca roemeri</i> )	2							
California fescue ( <i>Festuca californica</i> )	3							


















		Common Name <i>Scientific Name</i>	Moisture Regime	Exposure	Height x Width	Width	Time of Bloom
FORBS		farewell-to-spring <i>Clarkia amoena</i>			2.5'	2'	June - July
		grand collomia <i>Collomia grandiflora</i>			18"	18"	May - July
		Columbia tickseed <i>Coreopsis tinctoria v. atkinsoniana</i>			2'	12"	May - July
		Oregon sunshine <i>Eriophyllum lanatum</i>			2'	18"	June - August
		western alpine strawberry <i>Fragaria virginiana v. platypetala</i>			6"	12"	April - July

Photo Credit (top to bottom): Mary Bushman, BES, Mary Bushman; Terry Glase; Mary Bushman; Thomas L Muller



# Aesthetic Considerations

- Small palate for small place
- Strategically locate “anchor plants”
- Clump species
- Consider clear dividers of plant groupings
- Seasonal interest



# A Dynamic Landscape



Late April: California oatgrass & Western buttercup

Photo: Laura Taylor



# A Dynamic Landscape

A photograph of a garden in early-mid May. The foreground is filled with tall, green grasses interspersed with numerous small yellow buttercup flowers. Several pink flowers, identified as rose checker-mallows, are scattered throughout the grass. To the left, there are dark purple flowers. The garden is bordered by a paved street. In the background, a white house with a chimney and a wooden fence are visible, along with other greenery and trees under a clear sky.

Early-Mid May: Rose checker-mallow & Western buttercup

Photo: Laura Taylor



# A Dynamic Landscape



Late May: Rose checker-mallow & California poppy

Photo: Laura Taylor



# Choose the right heights for sites...



Photo: Kammy Kern-Korot, *Sidelcea campestris*



Photo: EMSWCD, *Aster subspicatus*



A photograph of a single-story blue house with white trim. The house has a small porch with a black metal railing. A large window with white curtains is visible on the left. A smaller window with a white frame is on the right. A flower box is mounted on the wall above the porch steps. The front yard is filled with a dense garden of yellow and pink flowers, including Black-eyed Susans and cosmos. A white picket fence runs along the front of the garden. The text "Native and non-natives co-mingled" is overlaid in yellow at the top.

Native and non-natives co-mingled

Photo: Eric Mader,  
Xerces Society



# Site Preparation

- Minimum: spring – fall prep
- Organic:
  - Sod cutter + hand weeding + top dressing of “native” soil
  - Sheet mulching + hand weeding + top dressing of “native” soil
  - Solarizing + hand weeding + top dressing of “native” soil
  - ~~Scalping + hand weeding alone not enough~~
  - ~~Flaming and/or Organic Herbicides won't kill grass roots~~
- Spring spray + early fall spray + hand weeding

## Sheet mulching best for C-sequestration







# Meadow Establishment Strategies

- Start w/ plugs (perennial forbs & bunchgrasses) – strategically seed in annuals
- Clump like species (3-5)
- ~2 foot spacing
- Scratch in seed in fall
- Fencing



Photos: Gaylen Beatty & Michelle Bickley



# Grass as Seeds & Starts



Seeded California Oat Grass

Photo: Laura Taylor



# Grass as Seeds & Starts



Roemer's fescue planted from starts



# Maintenance

- Watering
- Disturbance for meadows
- Plan to weed “bullies”
- Many annuals will self sow
- Weeds love bare spots
- Avoid disturbance during primary bird nesting season
  - April 15<sup>th</sup> – August 1<sup>st</sup>





# Maintenance for Carbon Sequestration

- Leave grass clippings & leaves onsite (or compost)
- Add compost
- Add biochar
- Don't fertilize
- Don't till



Crop only

Crop + biochar

Crop + fertilizer

Crop+fertilizer+Biochar



# Challenges & Resources

- Public perception
- Tall grass ordinance
- Maintenance
- Plant costs & availability
- Grass identification



## Pollinator Habitat

This area has been planted with a range of flowering native plants to provide good quality habitat for native bees and other pollinators.

For information about creating habitat for pollinators, please visit:

[www.xerces.org](http://www.xerces.org)

[www.wmswcd.org](http://www.wmswcd.org)



THE XERCES SOCIETY  
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The Xerces Society's Pollinator Conservation Program is supported by

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# Sourcing Plant Materials

- Questions to ask:
    - Native?
    - Sourcing?
    - Neonicotinoids?
  - Wholesale orders
  - Seed packet distribution
  - Retail “outreach”
- 
- Neonicitinoids:  
<https://www.xerces.org/pesticides>



Photo: Gaylen Beatty



Photo: Erica stokes, WMSWCD





Photo: Laura Taylor





Photo: Laura Taylor



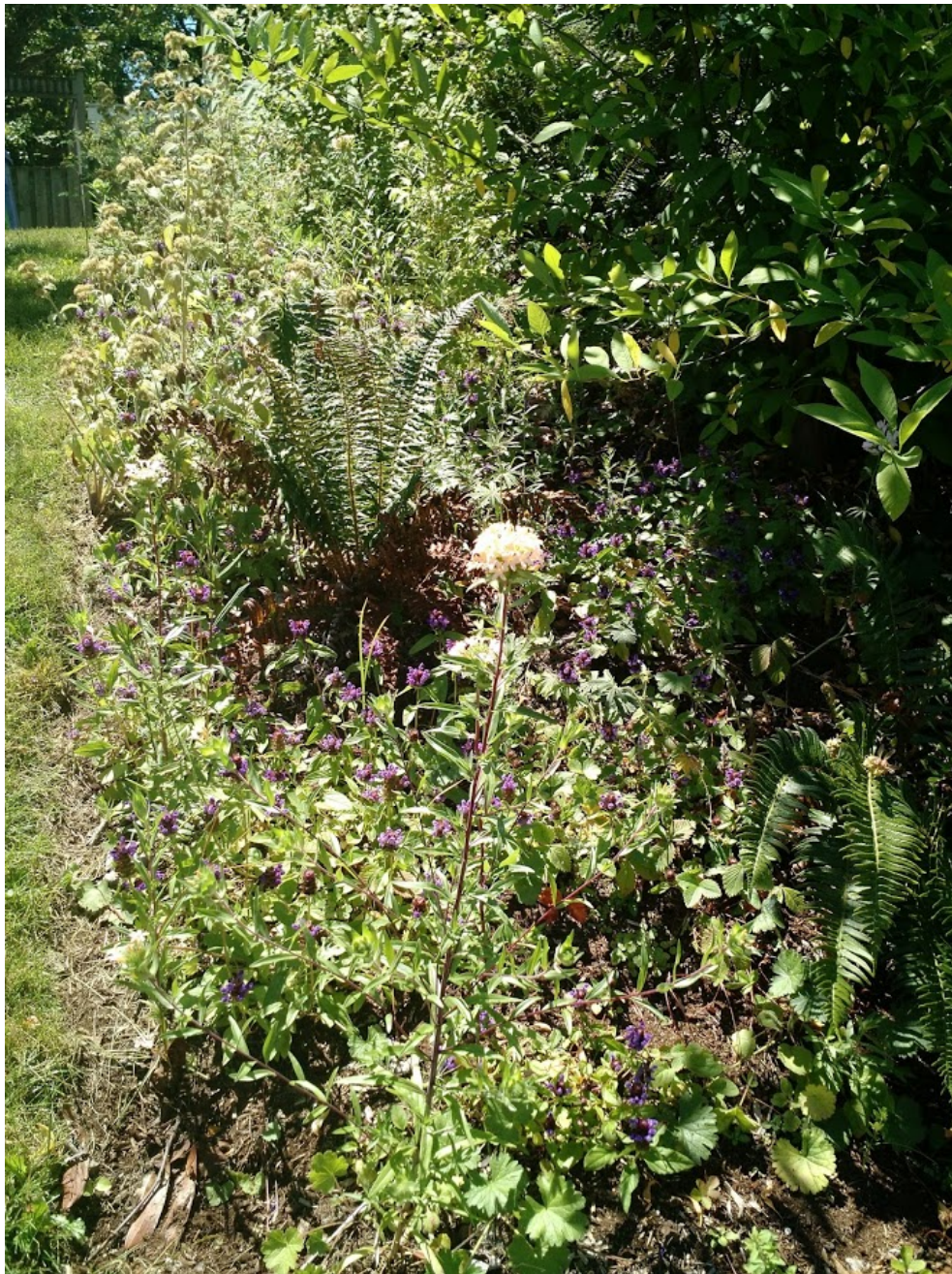


Photo: Laura Taylor



# Pacific NW Urban Meadowscaping (PNUM)





# Thank You!



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The Meadowsaping Handbook

Available on our website