

MEADOWSCAPING

FOR CARBON SEQUESTRATION

GREENWORKS



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Education Coordinator

Overview

- 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

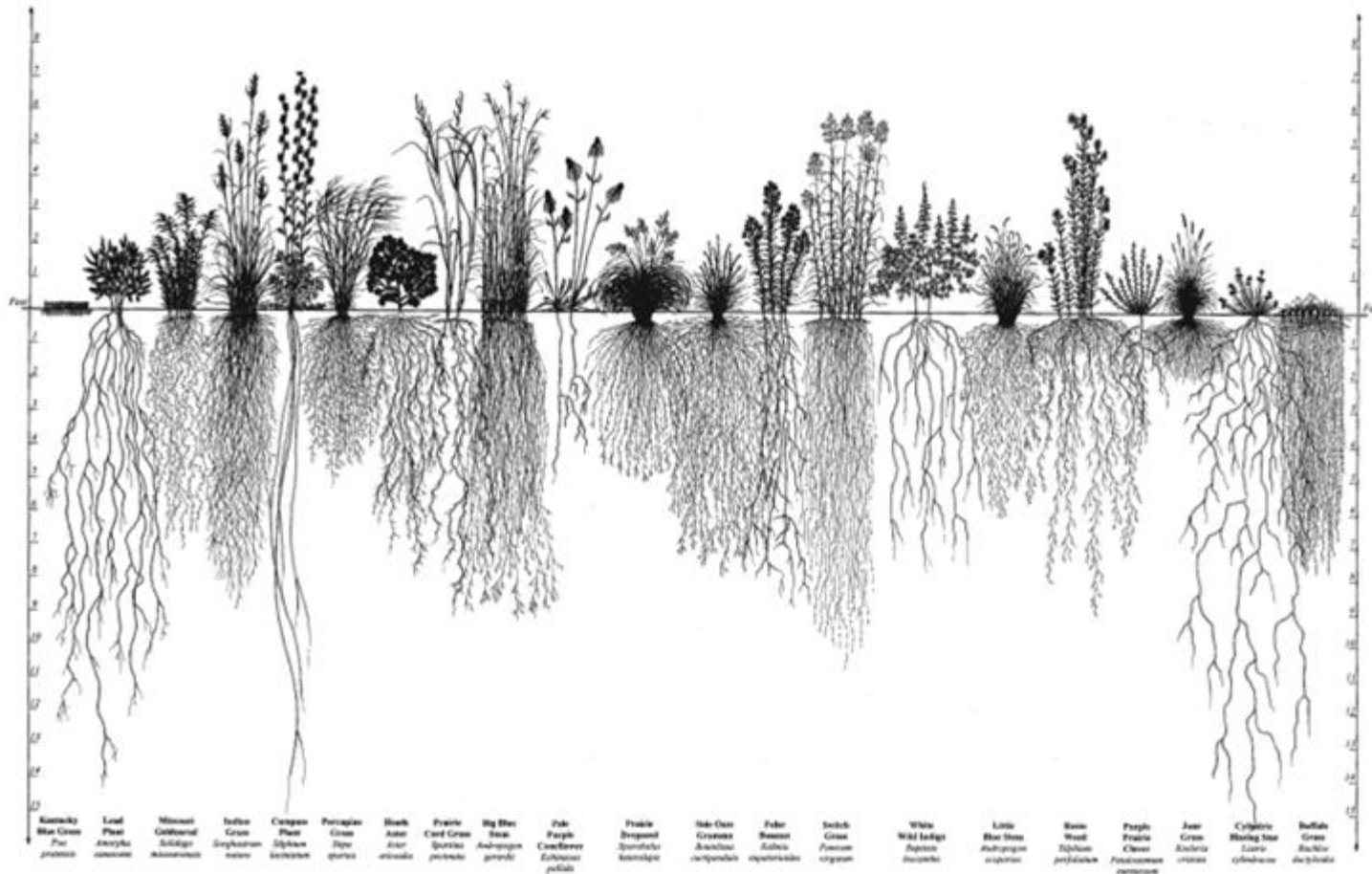
Why convert a lawn?

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



Andrena (Mining Bee) on Goldfields (Lasthenia californica).
Photo Credit: Mace Vaughn, Xerces Society

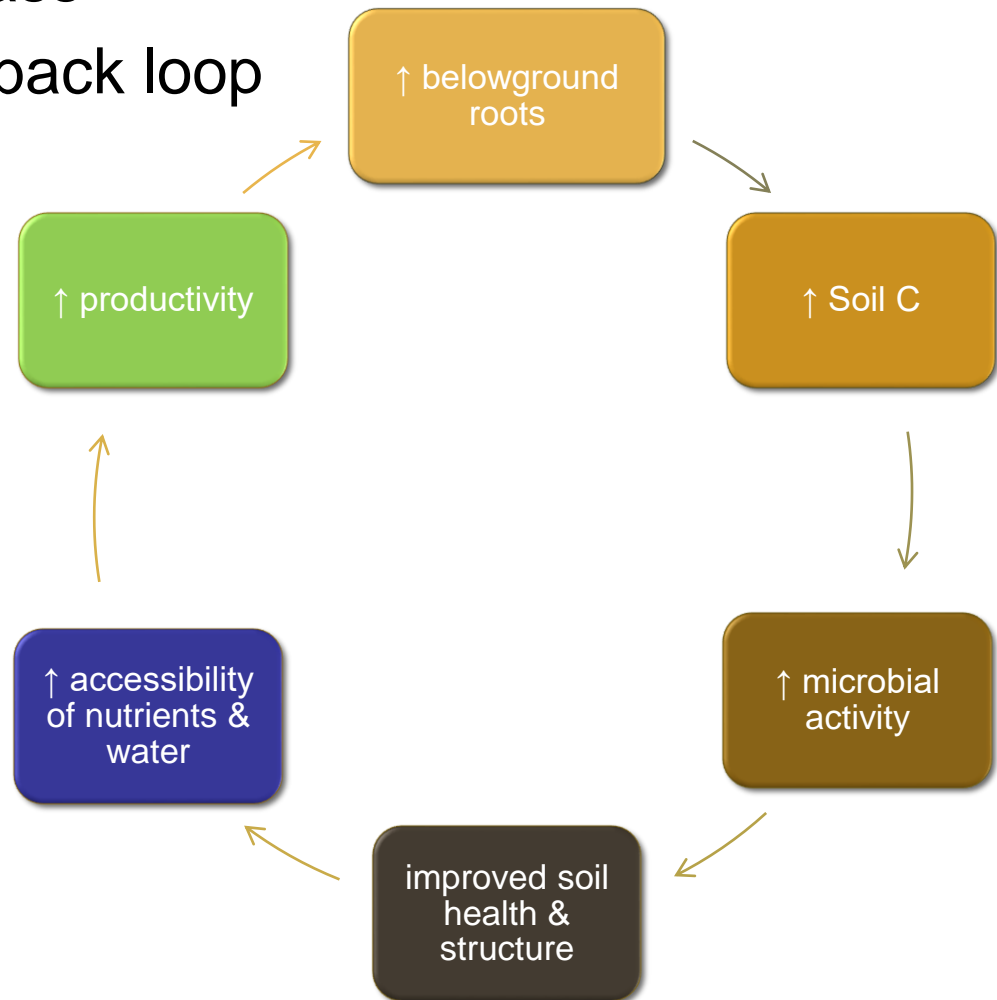
Stormwater Management & Carbon Sequestration



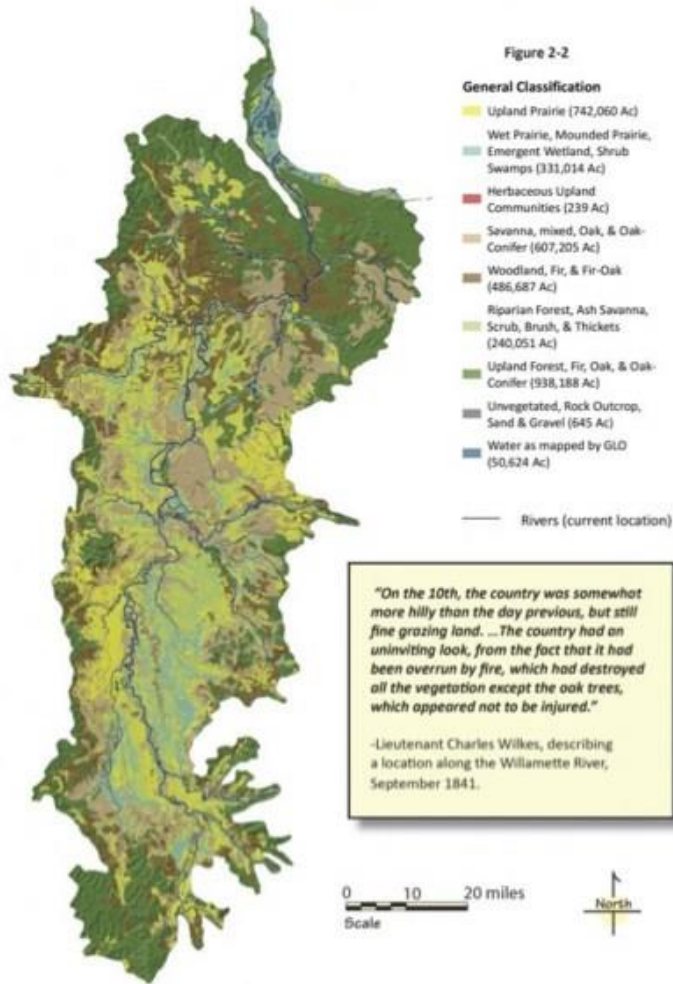
Credit: Natural Resources Conservation Service (NRCS) Illinois Native Plant Guide: Root Systems of Prairie Plants.

How Meadows Apes Sequester Carbon

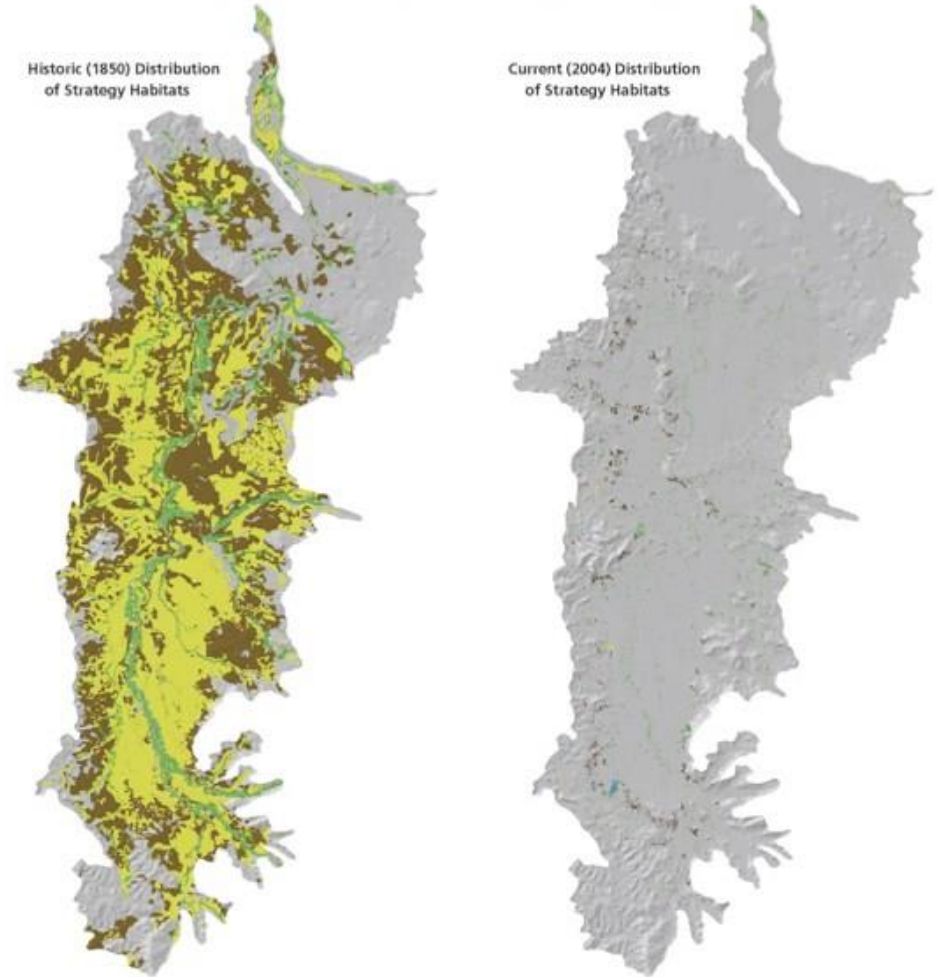
- ↑ Below-ground biomass
- ↑ Microbial-plant feedback loop
- ↓ fertilizer inputs
- ↓ mowing (fuel)



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)



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.

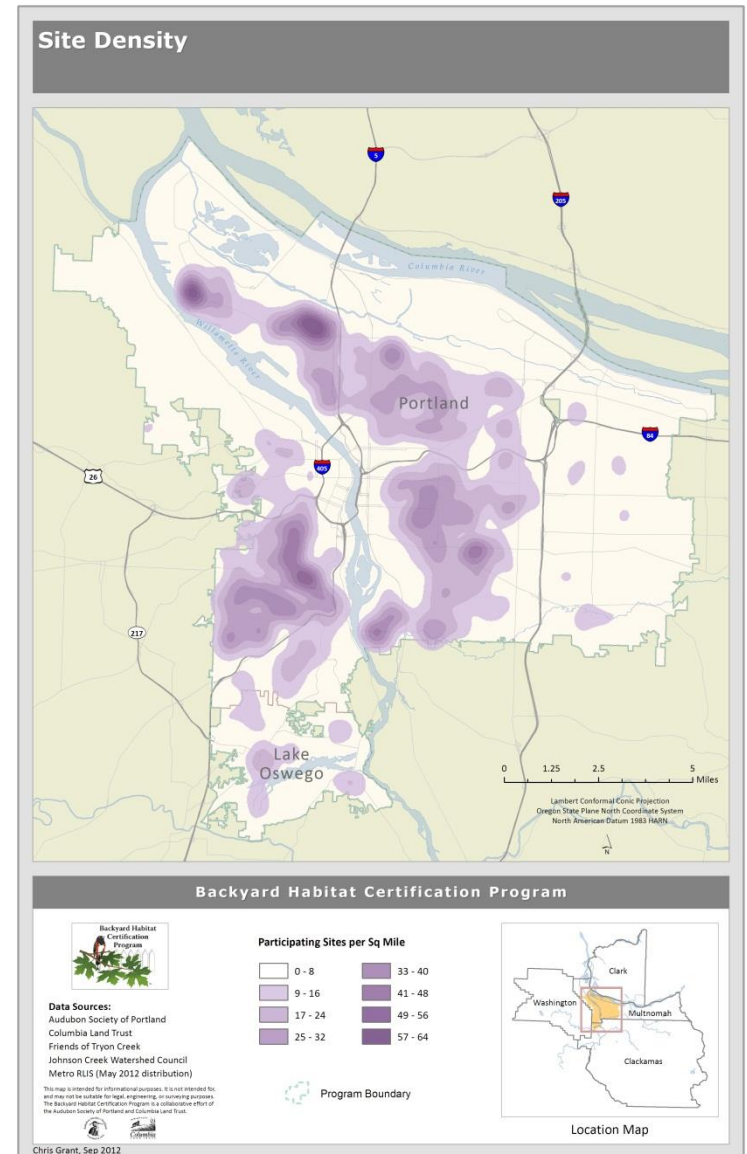
For information about creating habitat for pollinators, please visit:
www.xerces.org
www.wmswcd.org



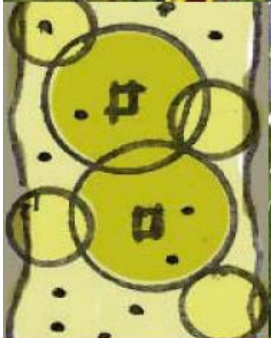
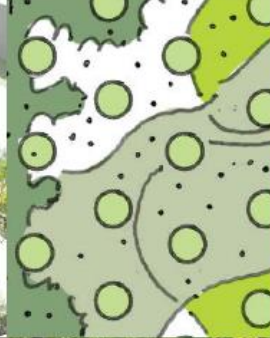
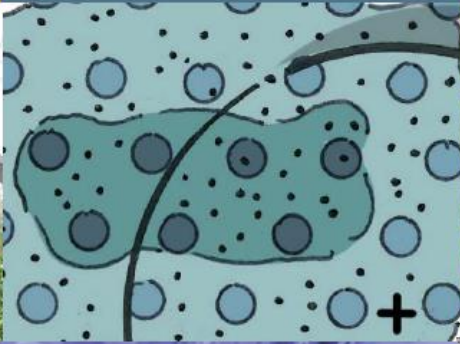
Habitat Connectivity



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



The Meadowscaping Handbook



WEST MULTNOMAH
Soil & Water Conservation District



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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



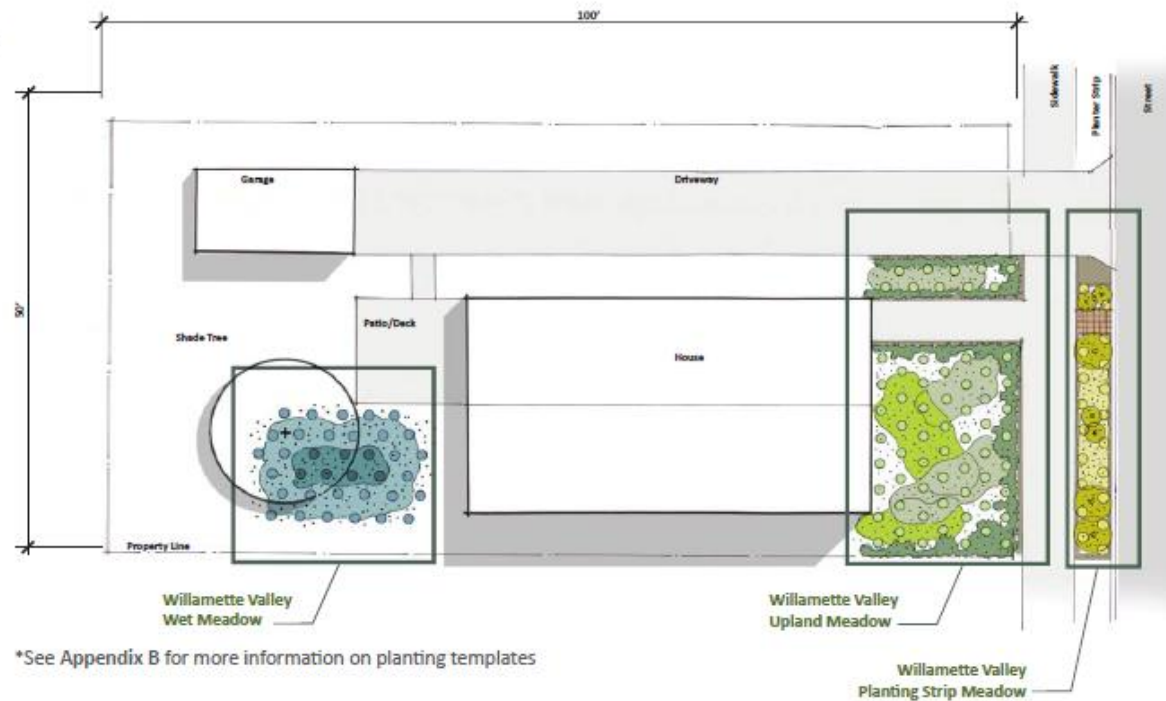


Consider unused spaces...



Photo credit: Bob Hansen, Corvallis

WILLAMETTE VALLEY MEADOW ZONE PLANTINGS



Pilot Meadowscape in Unused Space



Heavy Use Areas



• Photo: mulysa.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</i> ssp. <i>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		
salebrosa goldenrod (<i>Solidago canadensis</i> var. <i>salebrosa</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 roemerii</i>)	2							
California fescue (<i>Festuca californica</i>)	3							

FORBS
















	Common Name <i>Scientific Name</i>	Moisture Regime	Exposure	Height x Width	Width	Time of Bloom
	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



Photo Credit: Bob Hansen

A Dynamic Landscape



Danthonia californica



Ranunculus occidentalis & Camassia

Choose the right heights for sites...



Photo: EMSWCD, *Aster subspicatus*

Photo: Kammy Kern-Korot, *Sidelcea campestris*

Native and non-natives co-mingled



Photo credit: 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
 - ~~Flaming and/or Organic Herbicides won't kill grass roots~~
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 - ~~Flaming and/or Organic Herbicides won't kill grass roots~~
- Spring spray + early fall spray + hand weeding

Sheetmulching best for C-sequestration



Photo Credit: Jennifer D'Avanzo, GreenWorks



Photo: <http://thinkbluemarin.wordpress.com/>



Photo Credit: Nancy Lee Adamson, The Xerces Society

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



Grass as Seeds & Starts



Seeded California Oat Grass

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 nesting season:
April 15th – August 1st



Photo Credit: Jamie Stamberger

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

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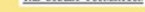
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The Xerces Society's Pollinator Conservation Program is supported by:



Sourcing Plant Materials

- Questions to ask:
 - Native?
 - Sourcing?
 - Neonicotinoids?
 - Wholesale orders
 - Seed packet distribution
 - Retail “outreach”
-
- Neonicitinoids:
<http://www.xerces.org/wp-content/uploads/2013/06/NeonicsInYourGarden.pdf>



Photo credit: Gaylen Beatty, CLT



Photo credit: Erica stokes, WMSWCD







Pacific NW Urban Meadowscaping (PNUM)



Thank You!



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The Meadowscaping Handbook:

https://wmswcd.org/wp-content/uploads/2016/04/Meadowscaping_Publication_Complete_LR.2.pdf?2f460d