



The Understory Species Increase Project:



# *The Need to Seed*



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# *Why the understory?*

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Vast resources spent on invasive removal.

Revegetation rarely includes herbaceous species.

- ✓ Biodiversity
- ✓ Nutrient cycling
- ✓ Wildlife
- ✓ Runoff & erosion control
- ✓ Protection from re-invasion



Ivy removal @ Tryon Creek- no revegetation



Ivy removal @ Tryon Creek- with seeding

# *Why not the understory?*

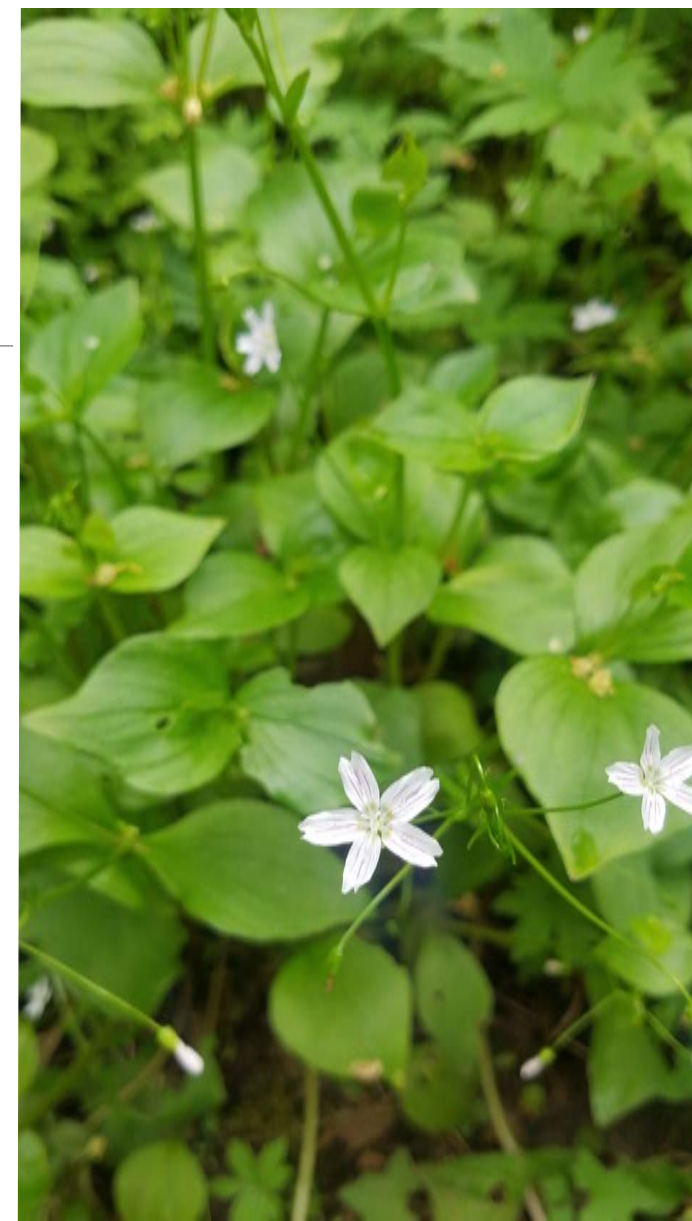
Lack of:

- Technical information
- Budget
- Commercial availability

Does seeding native herbaceous species following invasive removal significantly increase native species presence, cover, and diversity?

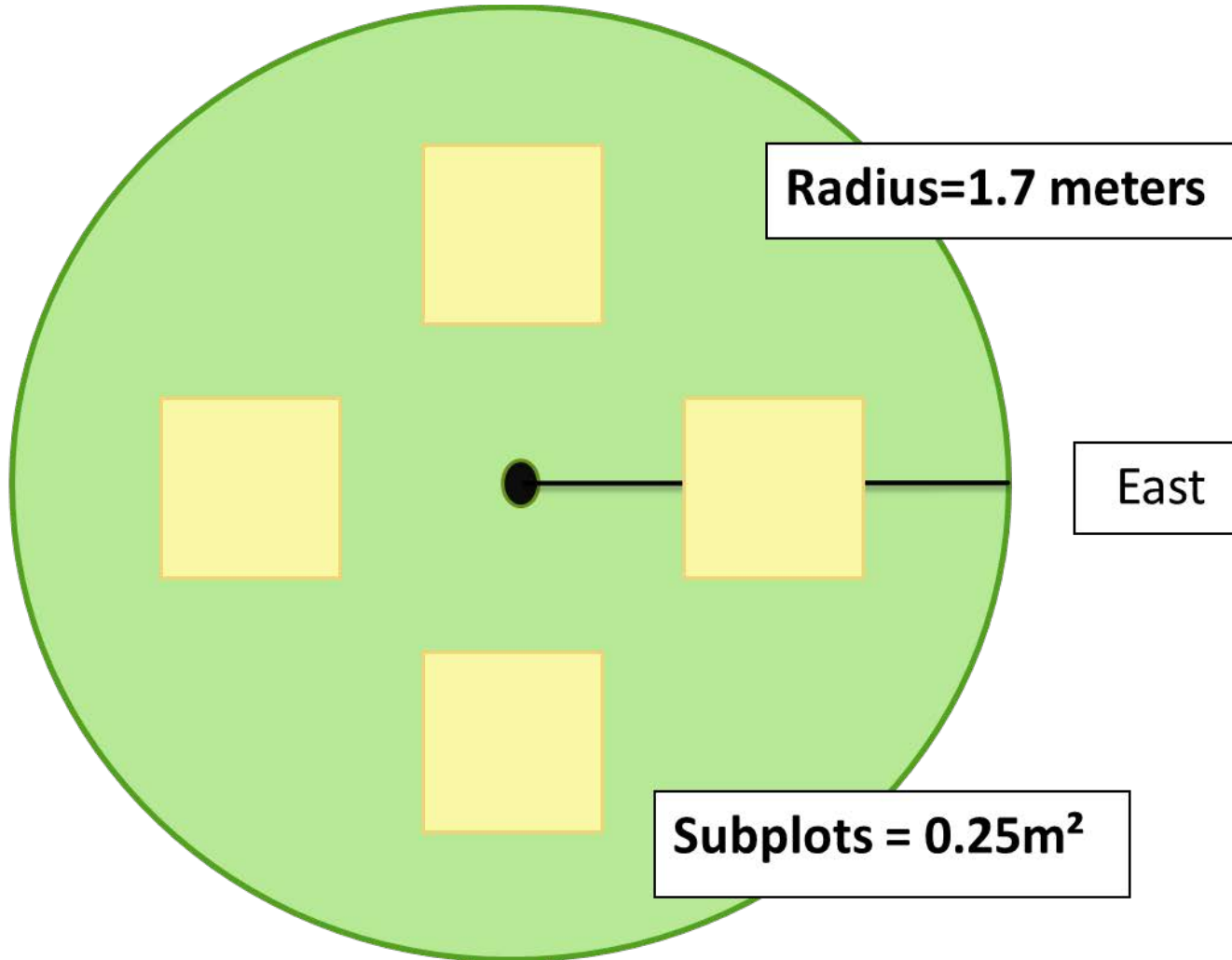


*Tellima grandiflora* (Fringecup)



*Claytonia sibirica* (Candyflower)

## Plot Layout



## Trial Plots

78 Plots installed Fall 2016-2018:

- 16 sites
- Half seeded, half control

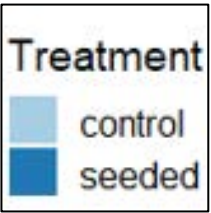
**Layout:** Circular w/ area  $\sim 9\text{m}^2$

- Semi-permanently marked center

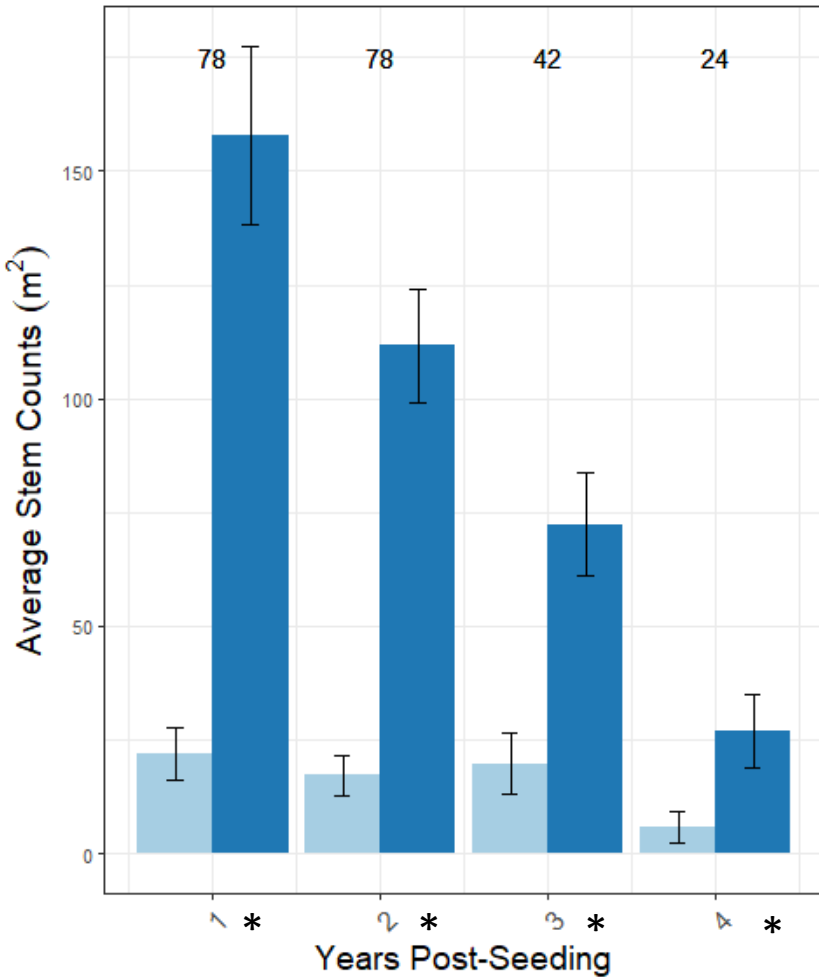
**Annual monitoring:**

- Percent cover  $> 5\%$
- Stem counts within 4 subplots

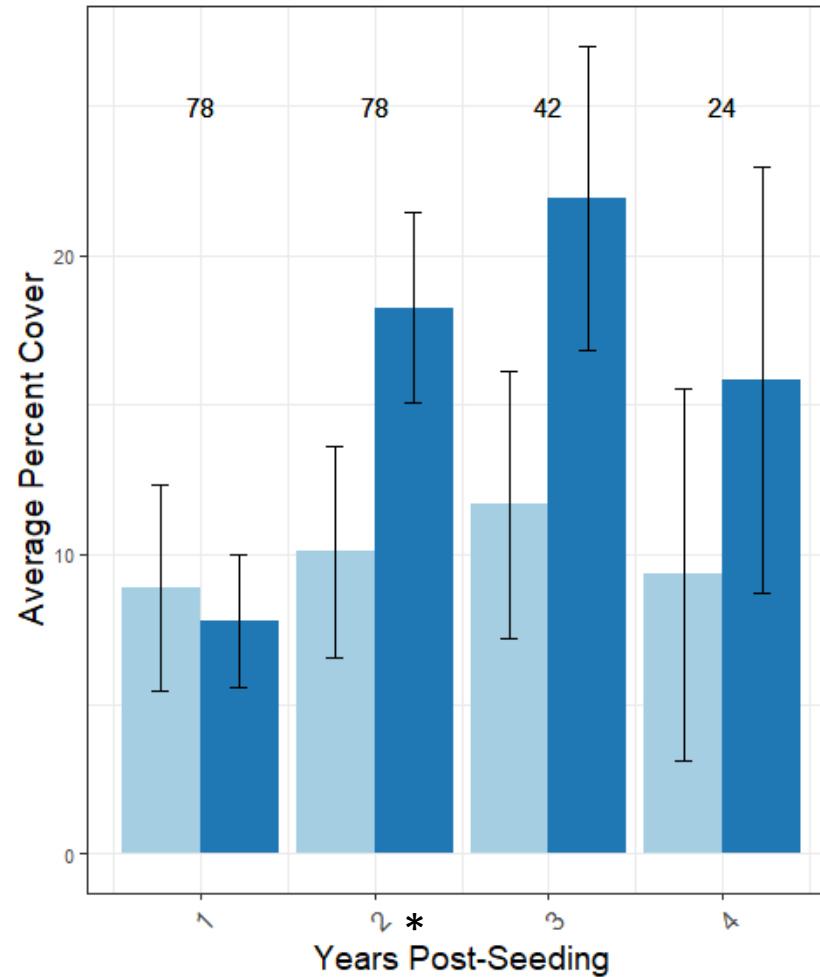
# Seeding increased germination, cover, and richness



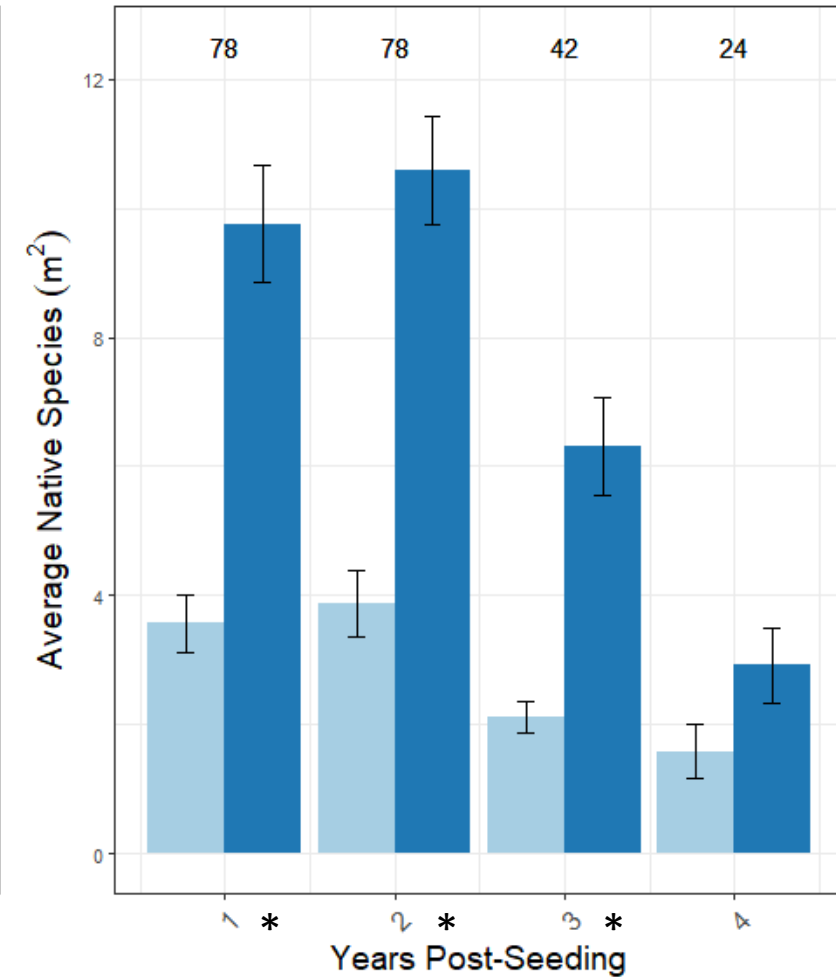
### Germination of Target Species \*



### Cover of Target Species \*



### Native Species Richness \*



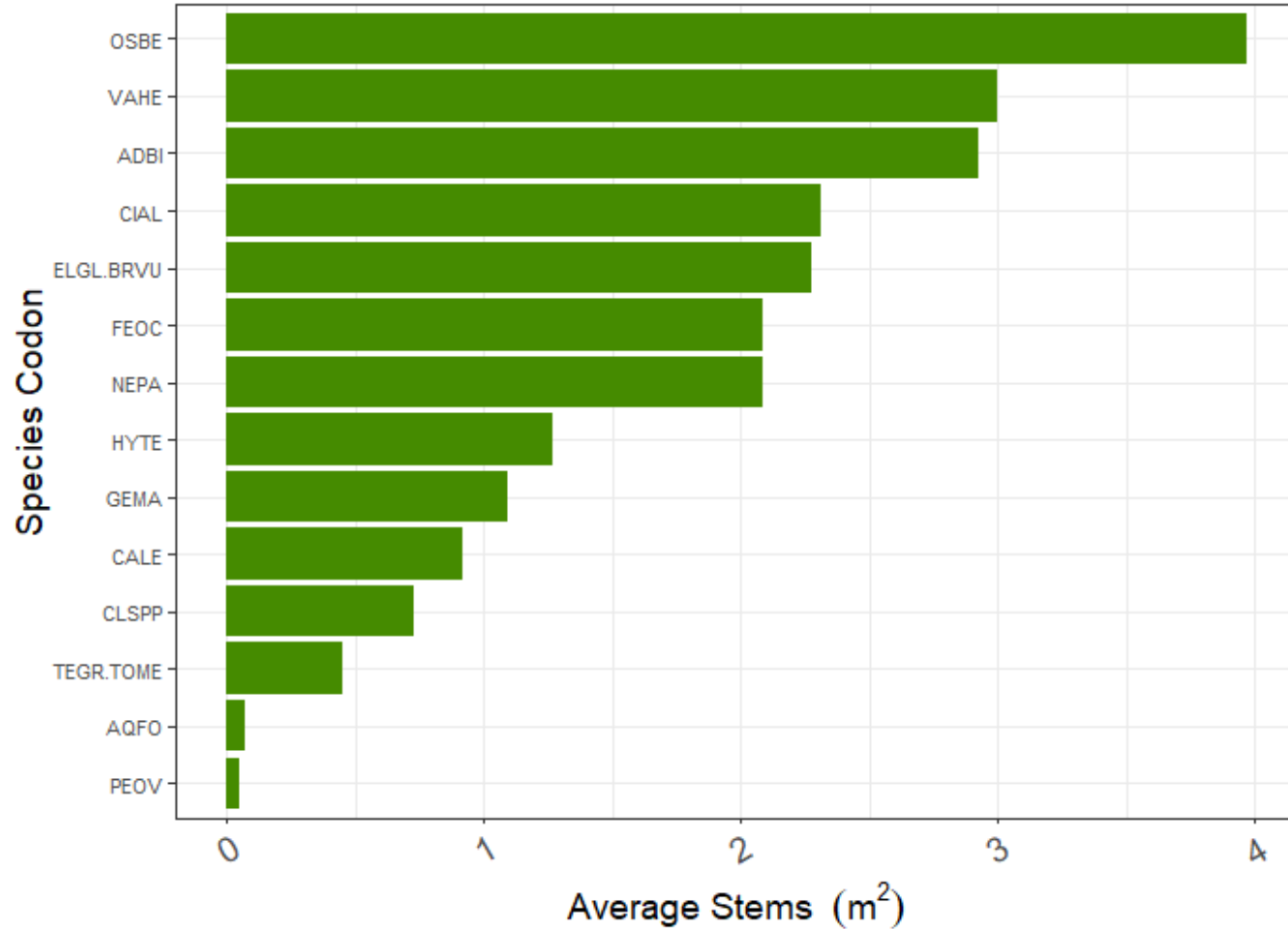
\* Wilcoxon Rank-Based significance, p=0.05

# Success varies by species and site

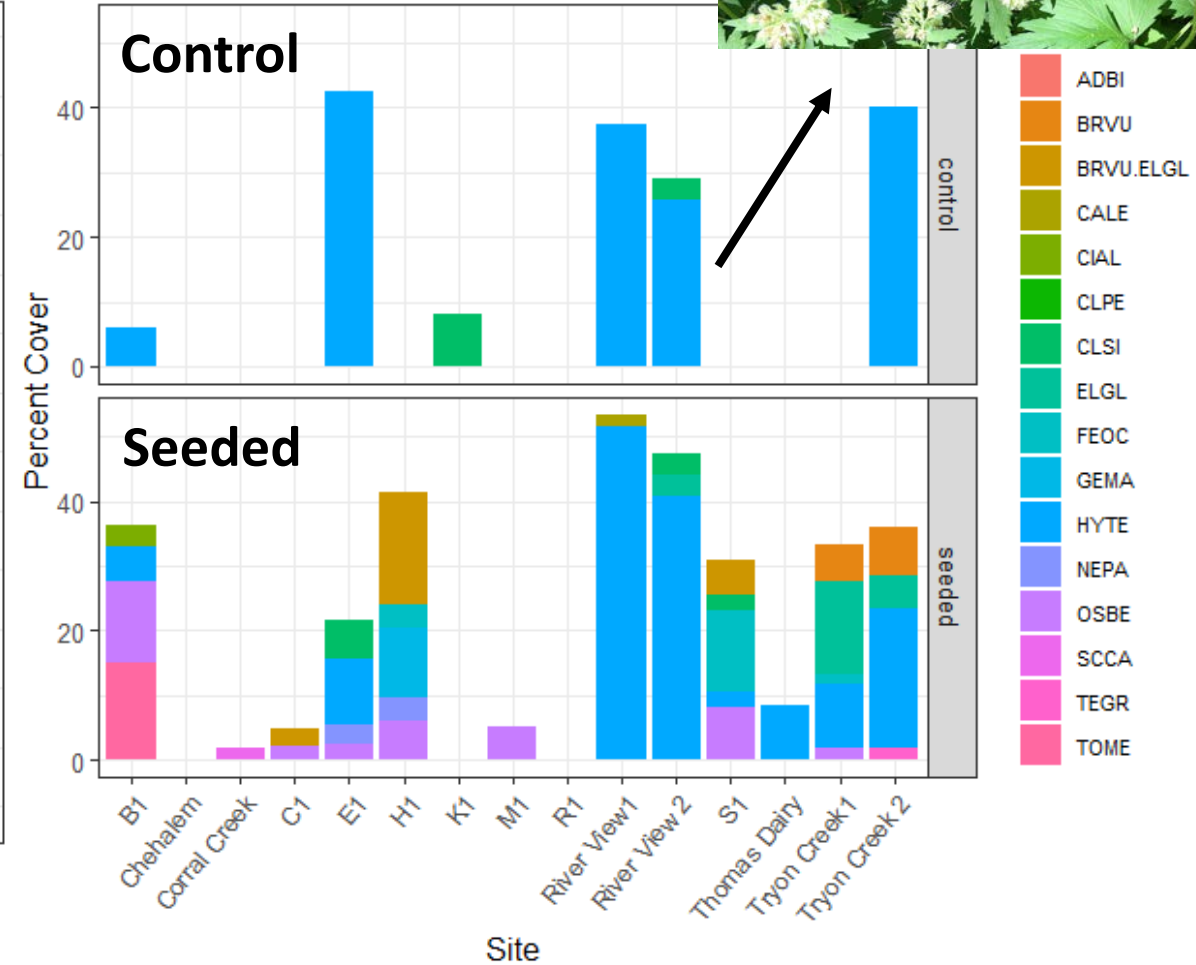
Pacific Waterleaf  
(*Hydrophyllum tenuipes*)



Species Stems per 1% of Seed Mix



Average Target Cover by Site

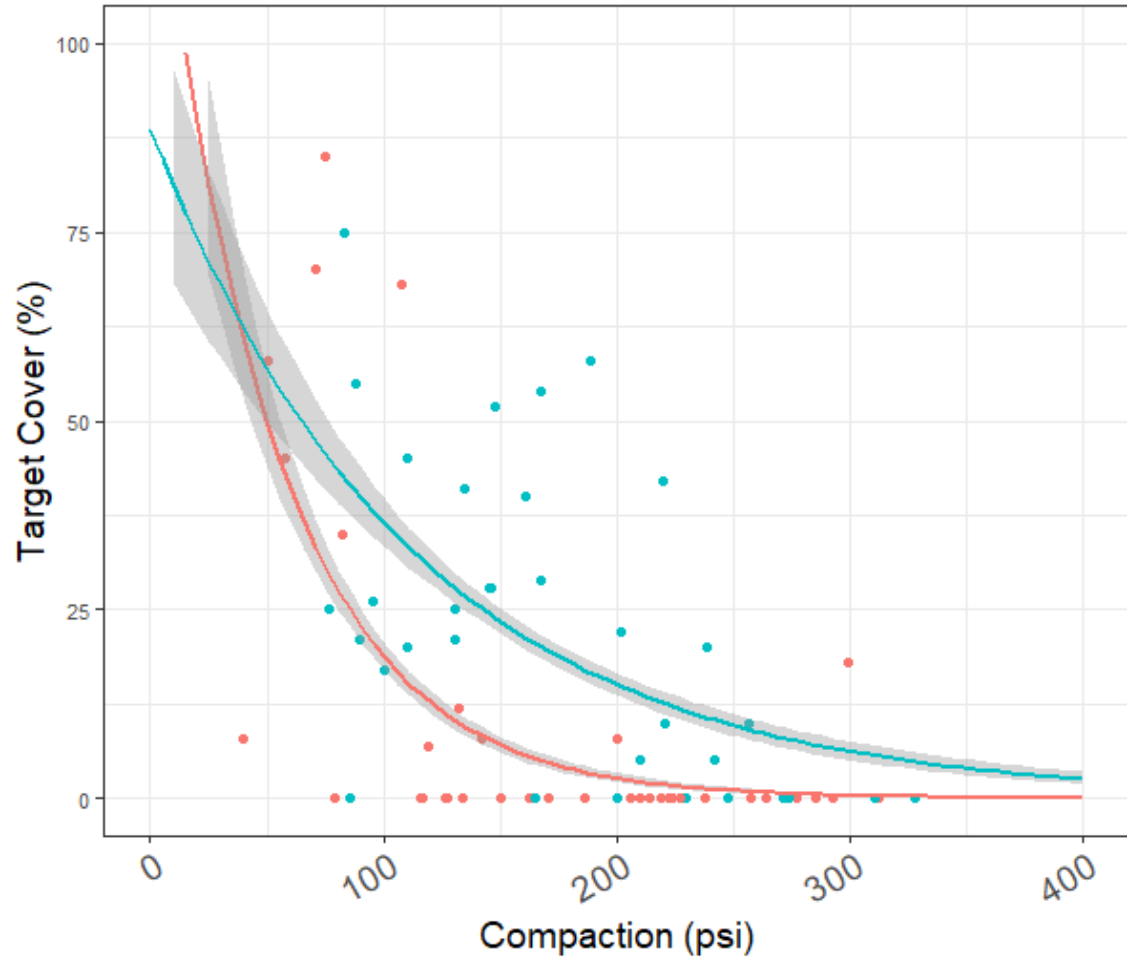


# Collecting More Data...

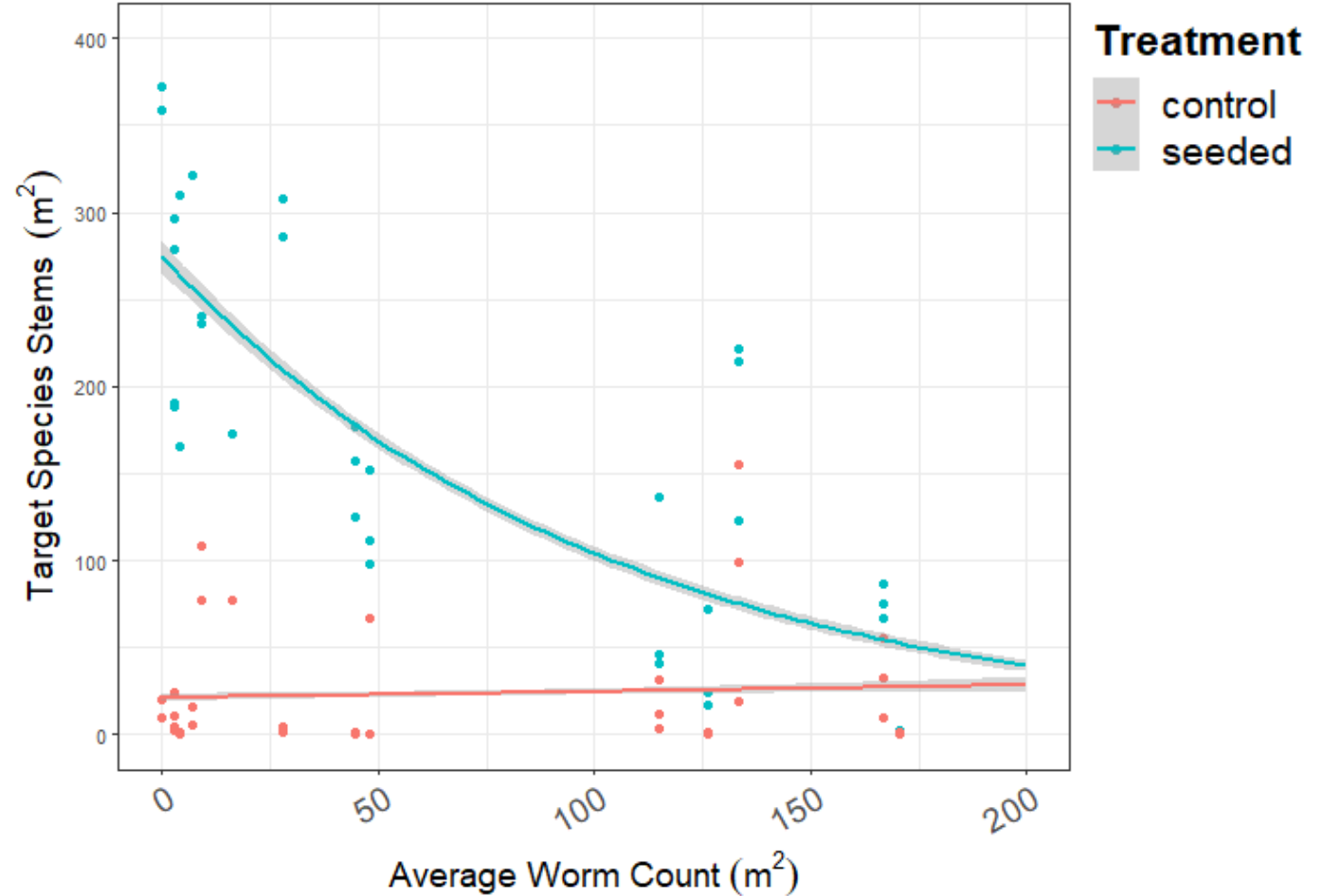


# Soil properties influence success

Target Cover in Response to Soil Compaction



Germination in Response to Worm Density



**Treatment**  
control  
seeded



# Key Findings

- Seeding significantly increased presence and cover of target species and native species richness.
- Success depends on site-specific factors, especially soil health.
- Species with the most successful establishment from seed:

*Grasses: Blue wildrye, Columbian brome, Western fescue*

*Circaea alpina*  
(Enchanter's nightshade)



*Osmorhiza berteroi*  
(Mountain sweet-cicely)



*Vancouveria hexandra*  
(Inside-out flower)



*Adenocaulon bicolor*  
(American trailplant)



*Nemophila parviflora*  
(Small-flower nemophila)





# Thank you!

For questions or more information, contact:  
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