



# THE FORAGE AND RANGE RESEARCH LABORATORY

*Forage and Range Research Laboratory*

Successional pathways  
of plant communities  
historically seeded with  
crested wheatgrass

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# Introduction



- **Degraded shrub-steppe rangelands**
  - Overgrazing
  - Exotic weed invasion
  - Halogeton Control Act of 1952.
  
- **Abandoned farmland**
  - Bankhead-Jones Land
  - Soil loss and erosion
  
- **Competitive**
- **Adapted**
- **Long-lived**
- **Met practical needs**





# Observations: structural composition

CRESTED dominated



HERBACEOUS dominated



HERB/SHRUB co-dominated



SHRUB dominated





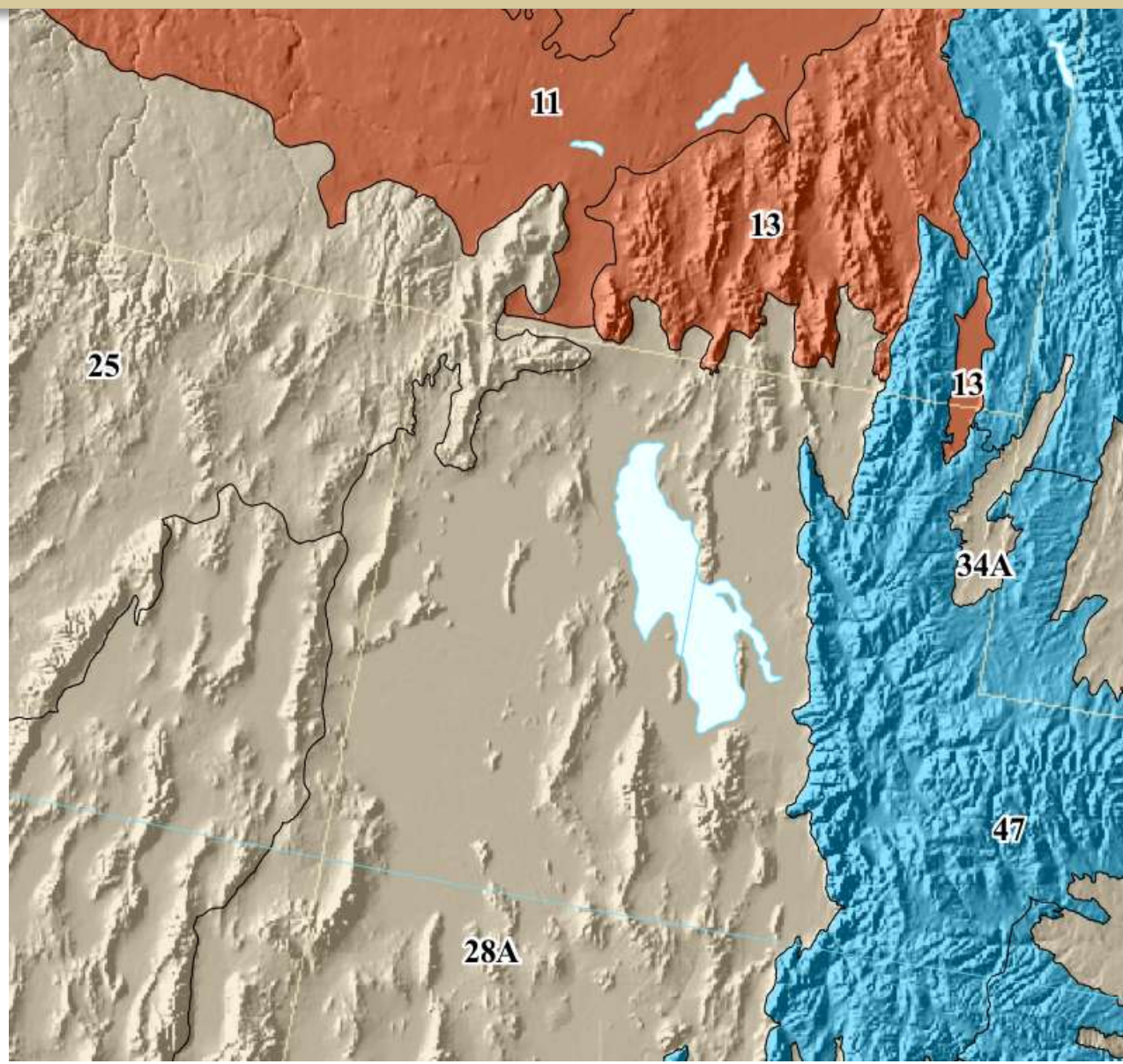
# Objectives

- Characterize variability in structural composition.
- Identify relationships between vegetation and soils.
- Speculate about potential successional pathways.



# Research Framework

- Major Land Resource Area (MLRA)
- Ecological Site Description (ESD)







# Research Framework

“There is simply too much variability in the landscape not to use ESDs ...”

1. The most effective way to interpret the landscape.
2. The most effective way to communicate interpretations.



# Predictions

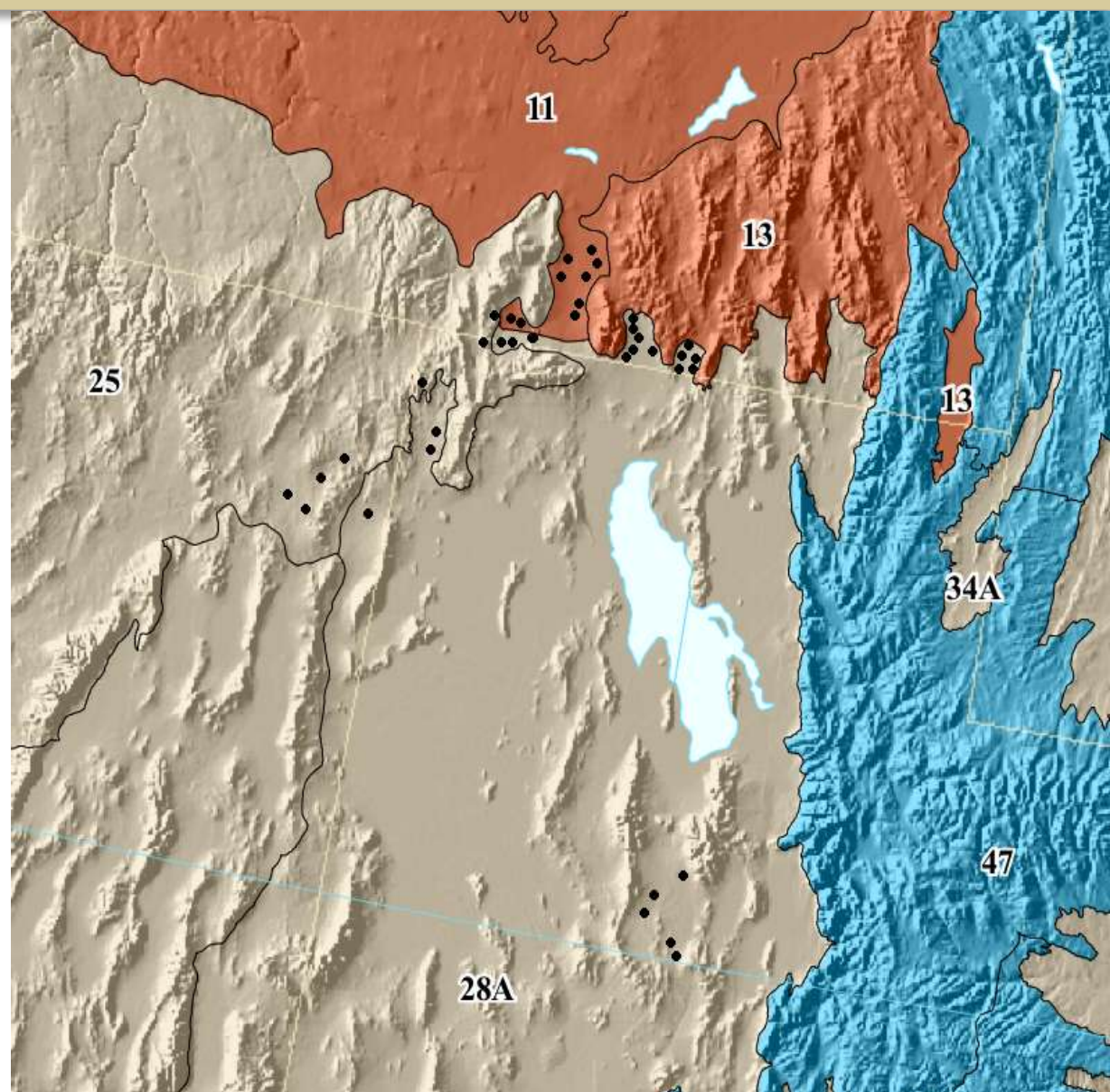
- 1) Considerable variation exists within MLRAs for crested wheatgrass and shrub dominance.
- 2) Crested wheatgrass and shrub abundance is negatively correlated.
- 3) Structural composition will have minimal departure from ESDs in the absence of shrub removal disturbance.



# Methods – Site Selection

## Site selection criteria:

- Seedlings greater than 30 years old.
- Never burned or retreated chemically or mechanically since establishment.
- Have similar grazing histories.

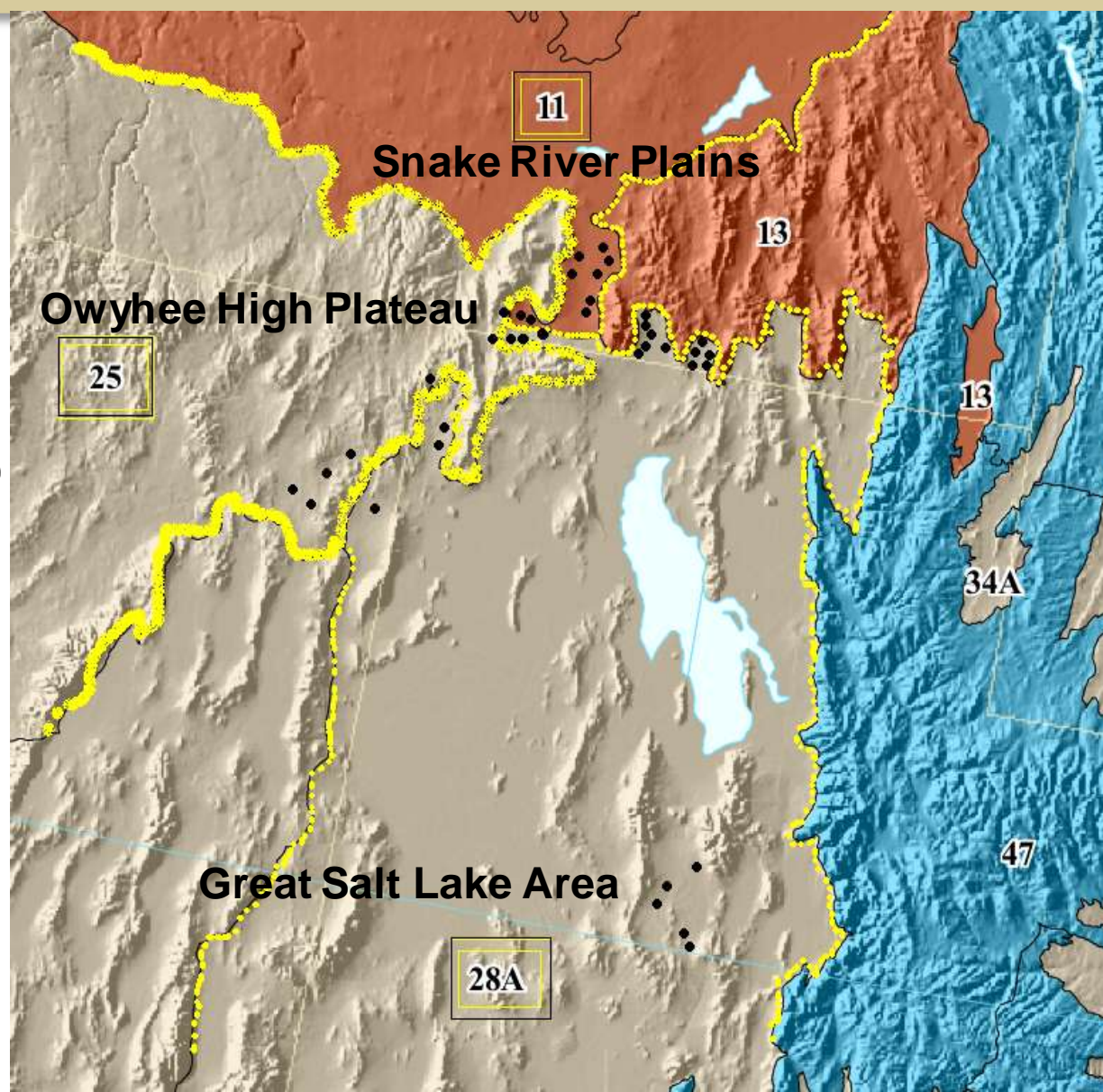






# Methods – Site Selection

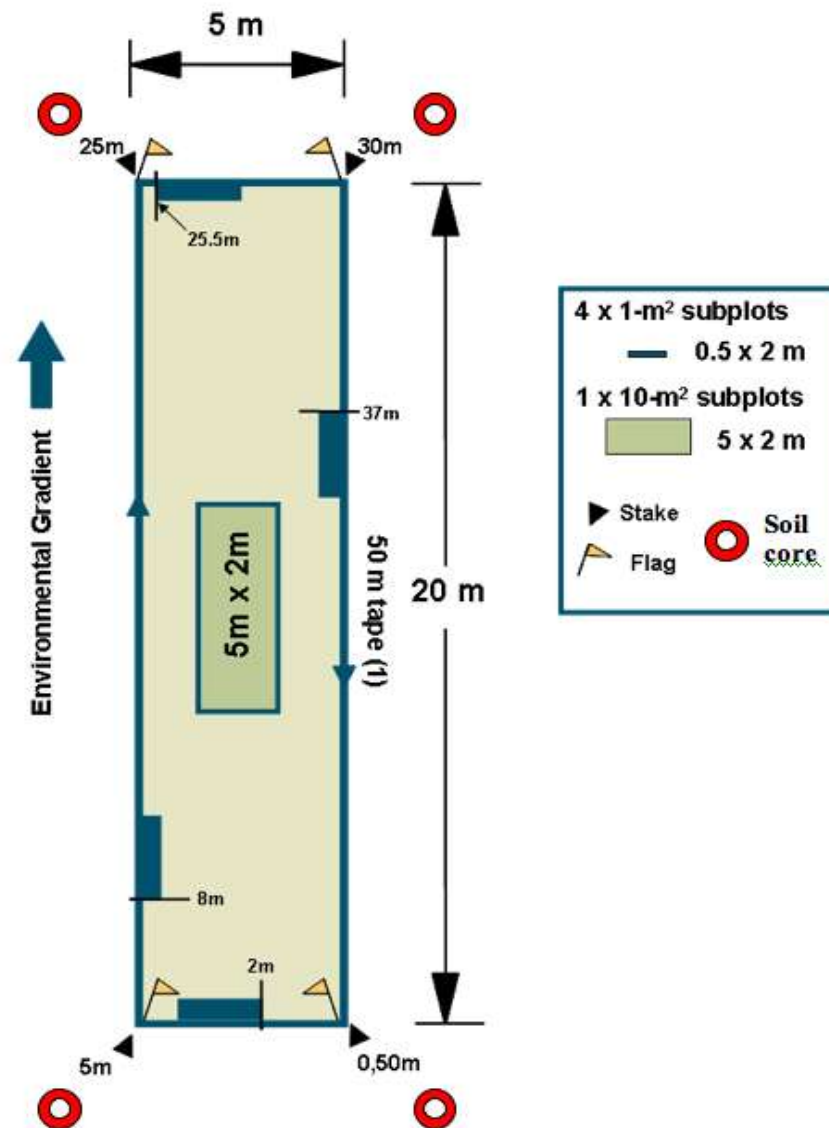
- 38 sagebrush sites
  - 3 MLRAs
    - Snake River Plains (11)
    - Owyhee High Plateau (25)
    - Great Salt Lake Area (28A)
- 15 different ESDs





# Field Methods

- 4 – Modified Whittaker plots per site
- Canopy cover
- Ground cover
- Species abundance
- Soils 0 - 15 cm
  - texture
  - nitrogen, carbon, pH
- Seed Bank analysis





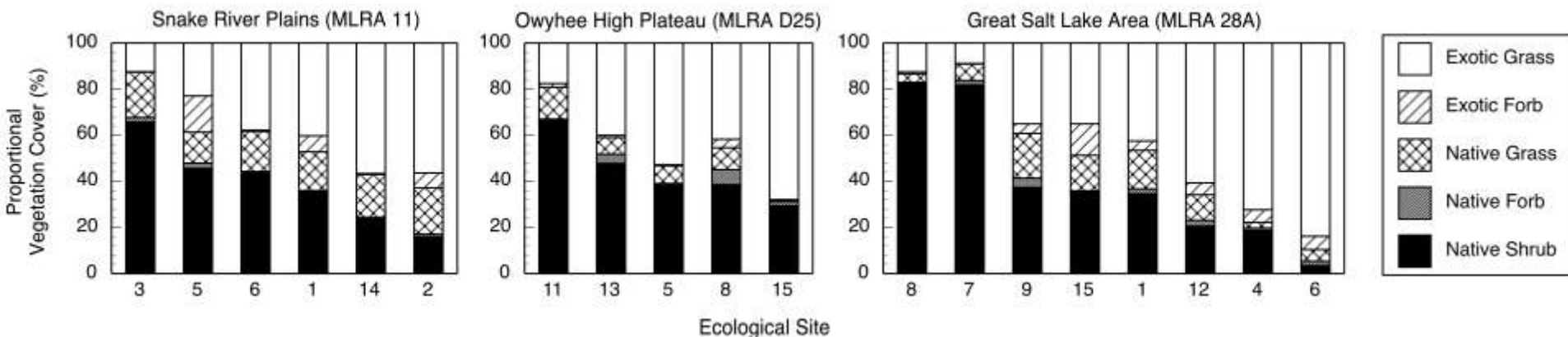
# Data Analyses

- Obj. 1: Descriptive structural composition
- Obj. 2: PCA – Factor analysis (plants & soil)
- Obj. 3: Compared structural composition data to ESD data





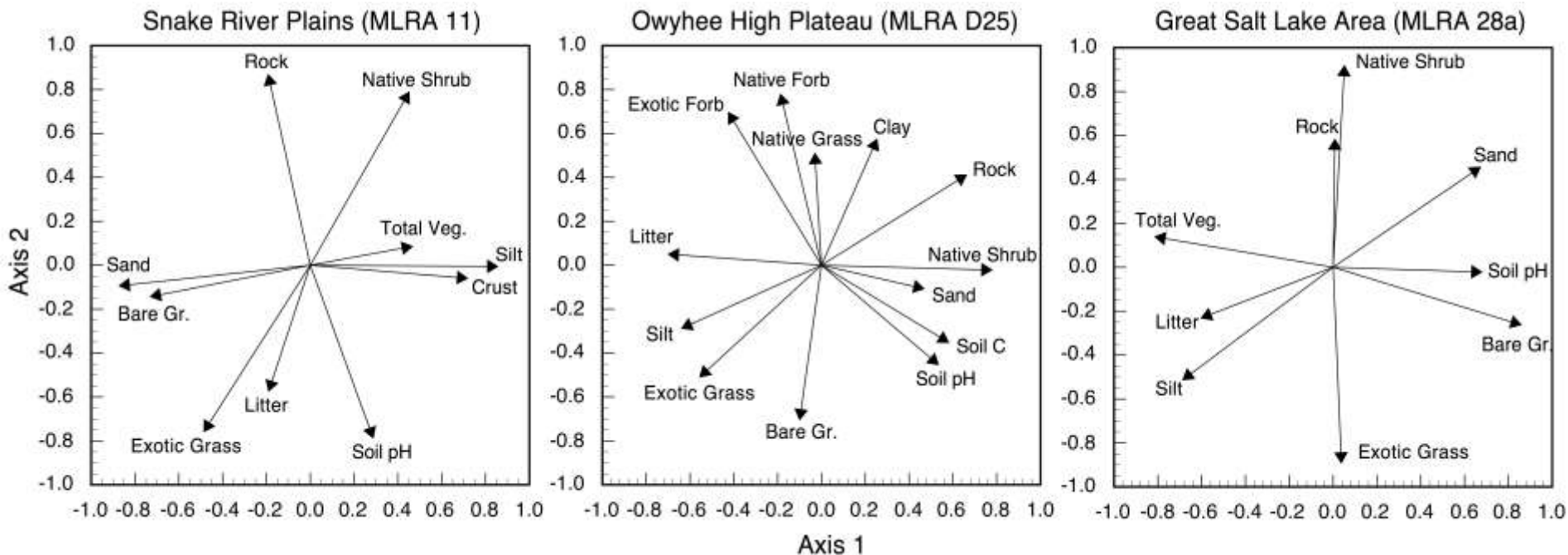
# Results (Obj. 1)



## Structural composition



# Results (Obj. 2)



Relationships between vegetation and soils



# Results (Obj. 3)

MLRA	% Grass	% Forb	% Shrub
11	-44 to 9	-9 to -3	-7 to 16
25	-31 to -9	-10 to -3	-25 to 9
28	-47 to -13	-8 to -1	-32 to 8

Structural composition departure from ESD





# Conclusions

- Prediction 1) Considerable variation exists within MLRAs for crested wheatgrass and shrub dominance.
  - Structural composition is different between ESDs within MLRA.
  - Crested wheatgrass seedlings are not created equal (i.e. they do not follow common assumptions).



# Conclusions

- Prediction 2) Crested wheatgrass and shrub abundance is negatively correlated.
- All 3 MLRAs followed this trend. Many other significant correlations occur between vegetation and soils among ESDs.



# Conclusions

- Prediction 3) Structural composition will have minimal departure from ESDs in the absence of shrub removal disturbance.
  - The structural composition of our data had a wide range of departure from the ESDs reference composition.
  - Implications for interpreting crested wheatgrass is knowing limitations of the seeded community.





# Implications

- Data suggest community pathways will be variable and not general across ESD's.
- Crested wheatgrass seedings are a state within ESD's.
- Succession within historically seeded sagebrush communities fits within ESD framework.
- Researchers and managers need to interpret the landscape from an ecological site perspective.
- Site-specific data to support new crested wheatgrass state-and-transition models for ESDs.



# Acknowledgment s

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# QUESTIONS?

WHERE'S THE CRESTED  
WHEATGRASS?



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