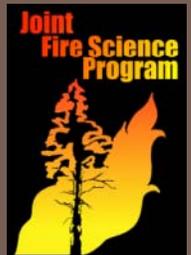
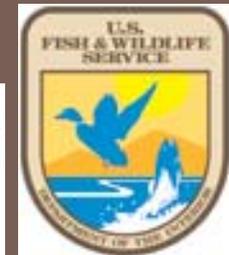


The Impact of Multiple Wildfires on Sagebrush-Steppe Communities:

Implications for Restoration



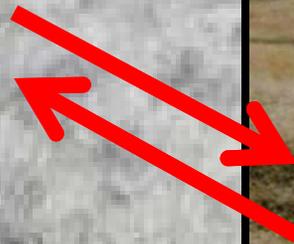
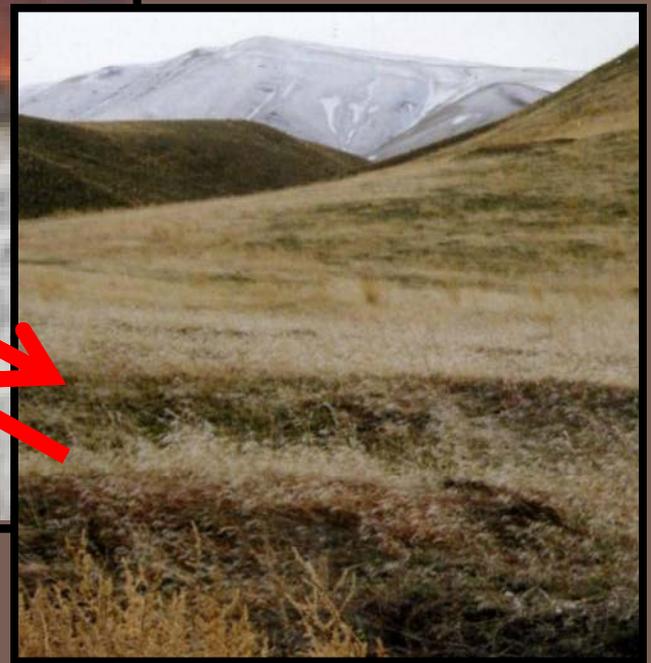
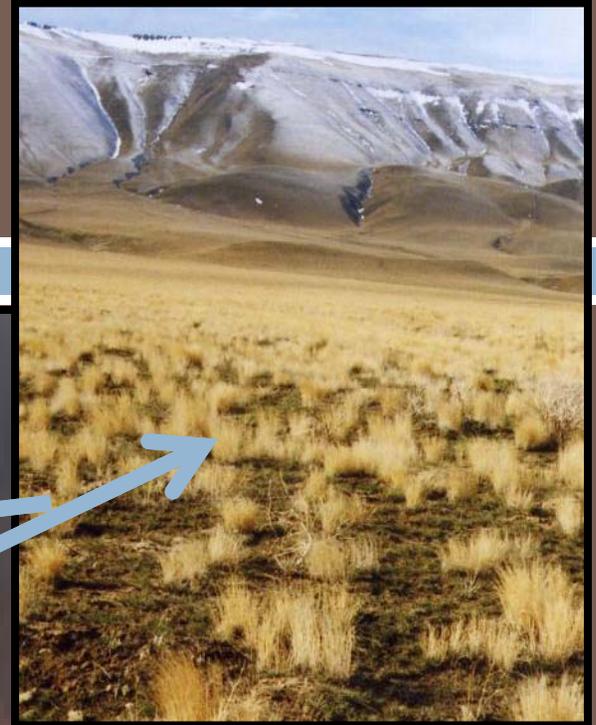
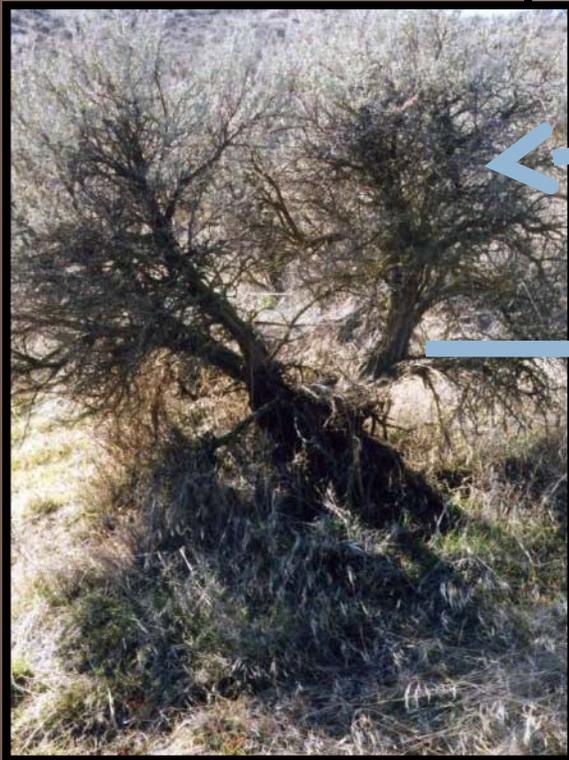
Eva Dettweiler-Robinson, G. Matt Davies, Jonathan D. Bakker,
Peter W. Dunwiddie, Jim Evans, Sonia A. Hall, & Janelle Downs



Sagebrush Shrubsteppe



Successional Trajectories

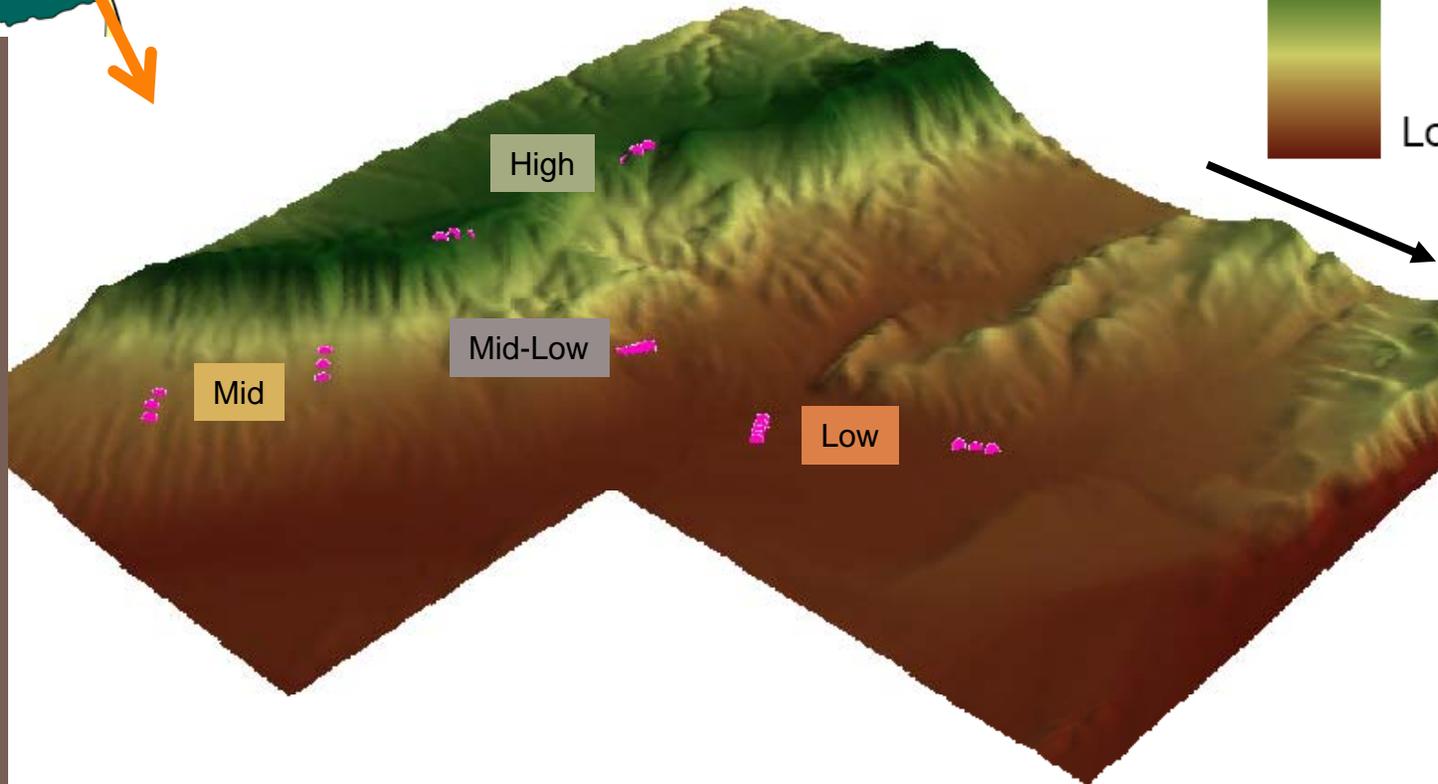


Arid Lands Ecology Reserve (ALE)

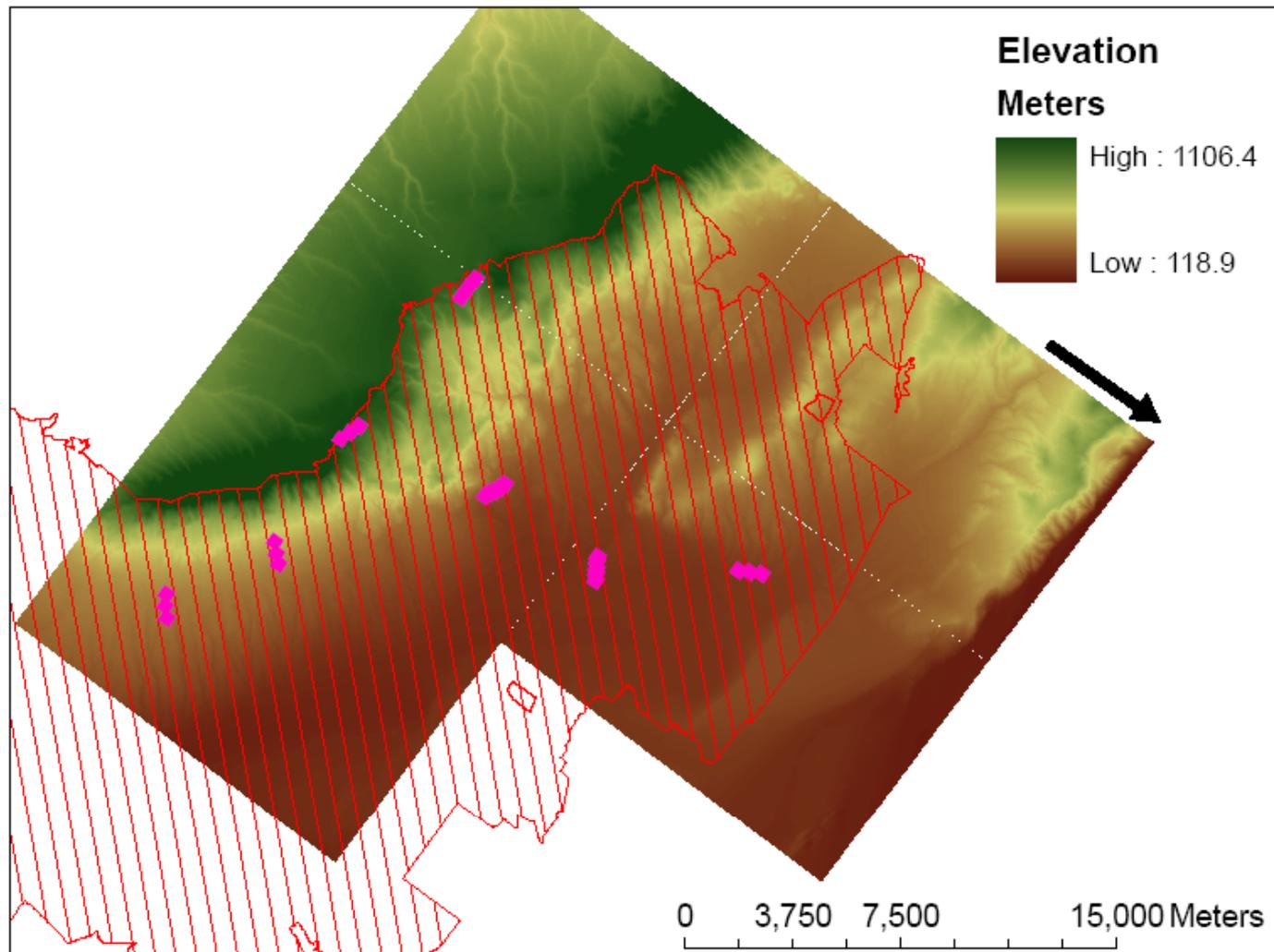


(PNNL)

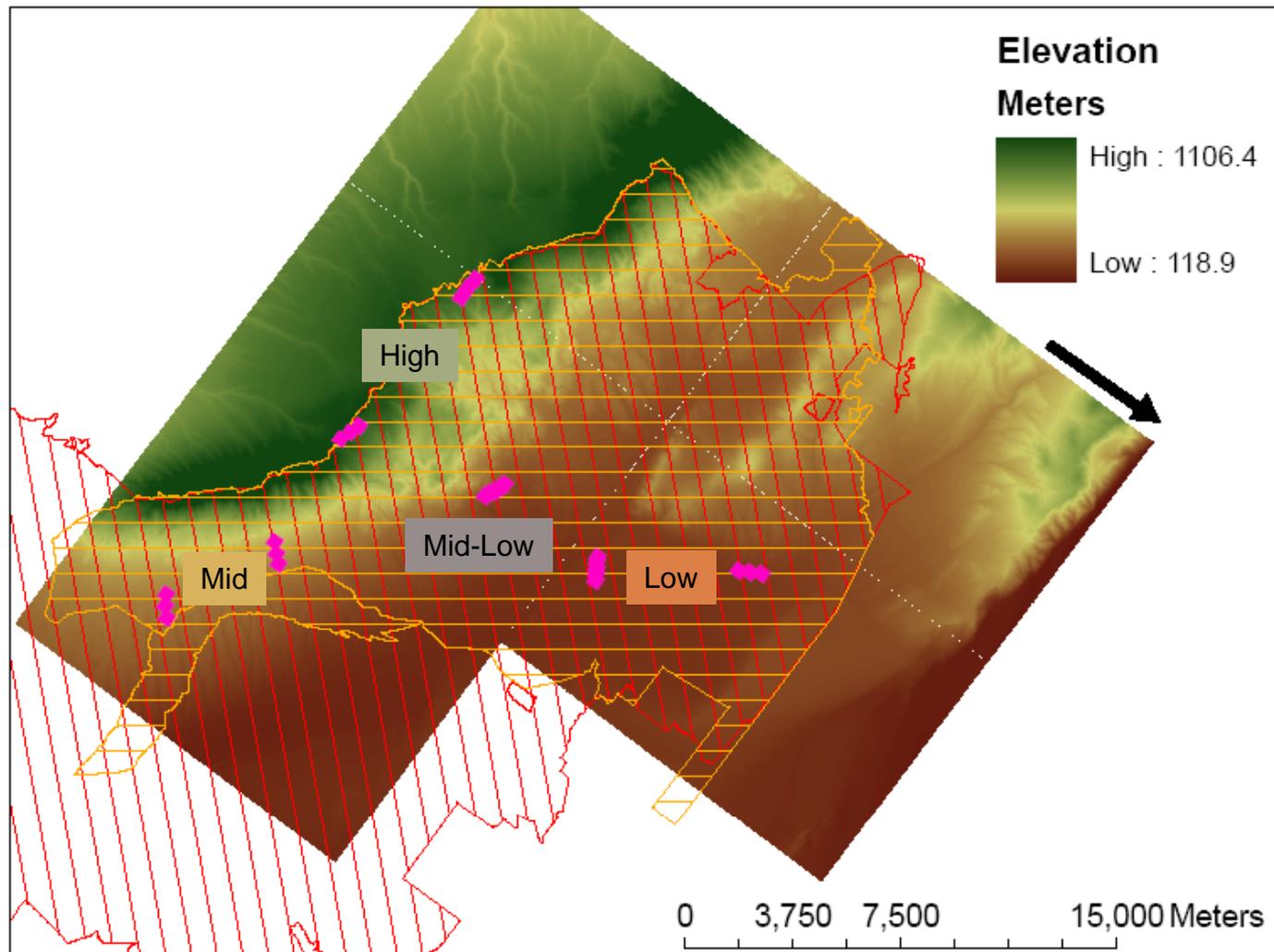
Elevation
Meters



2000 – 24 Command Fire



2007 – Wautoma and Milepost 17



Questions

- Are the communities responding similarly to repeated fire?
- How should restoration treatments differ among communities?

Methods

- Permanent plots with 3 or 5 transects 200m apart
- Transects are 100m long with quadrats every 5m
- Measured percent cover of each species in each quadrat
- Data from:
 - 1996
 - 2001-2004
 - 2009

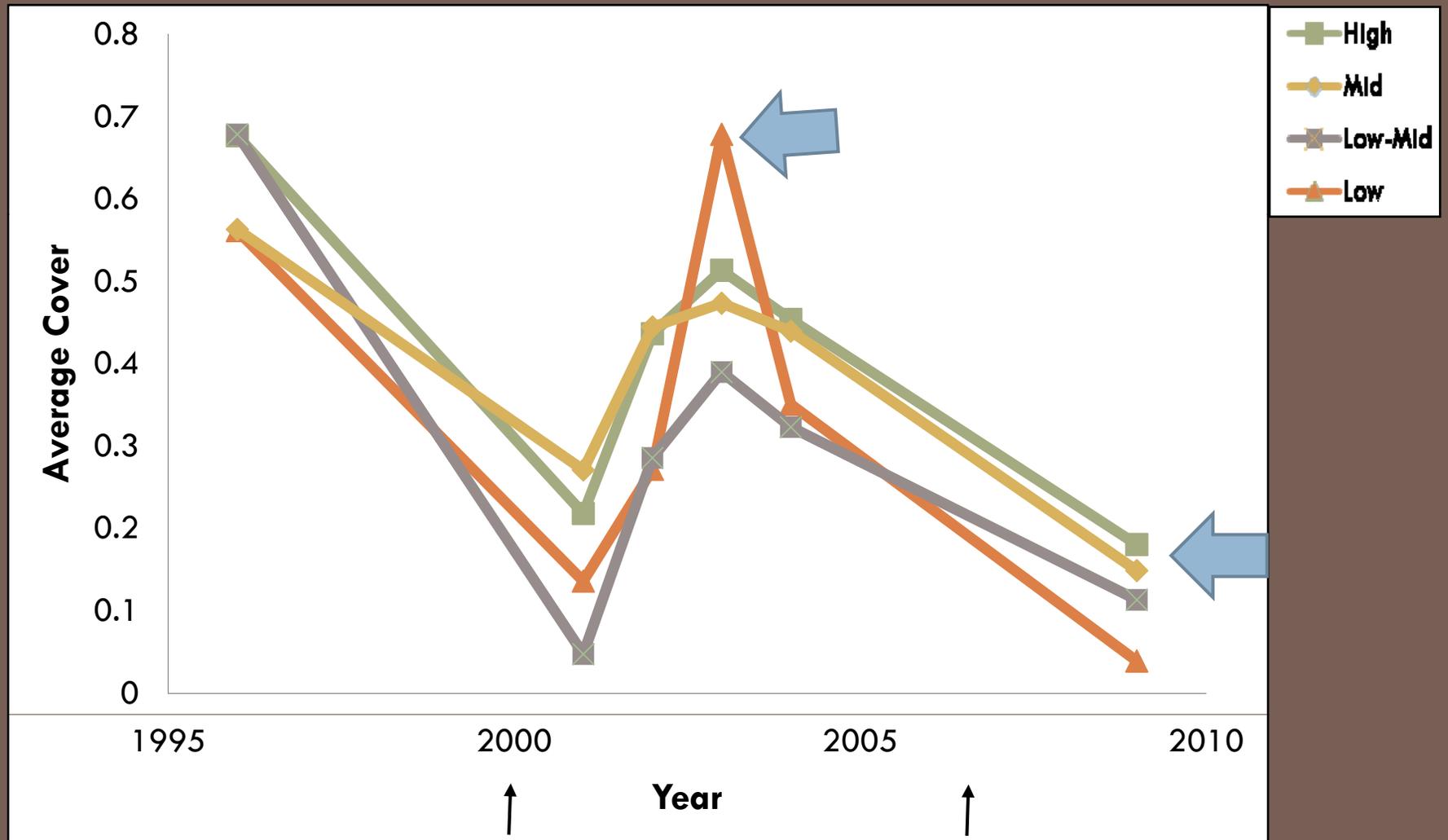


Analysis

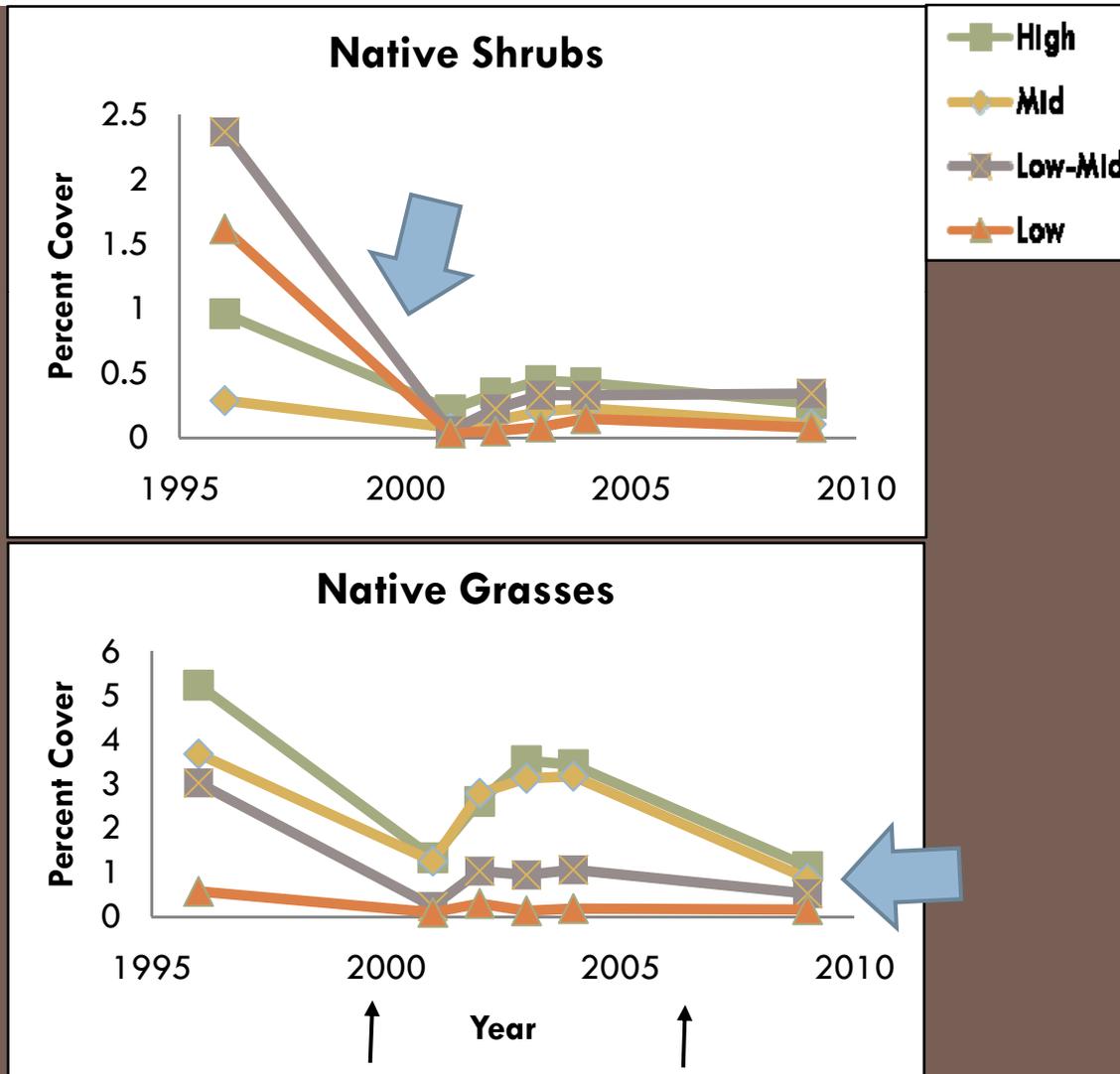
- Total Cover
- Cover by functional groups
 - ▣ Perennial / Annual
 - ▣ Native / Invasive
 - ▣ Shrub / Grass / Herb
- Native Species Richness
- Separation among communities
 - ▣ 1996, 2002, 2009
 - ▣ Cluster analysis and NMDS



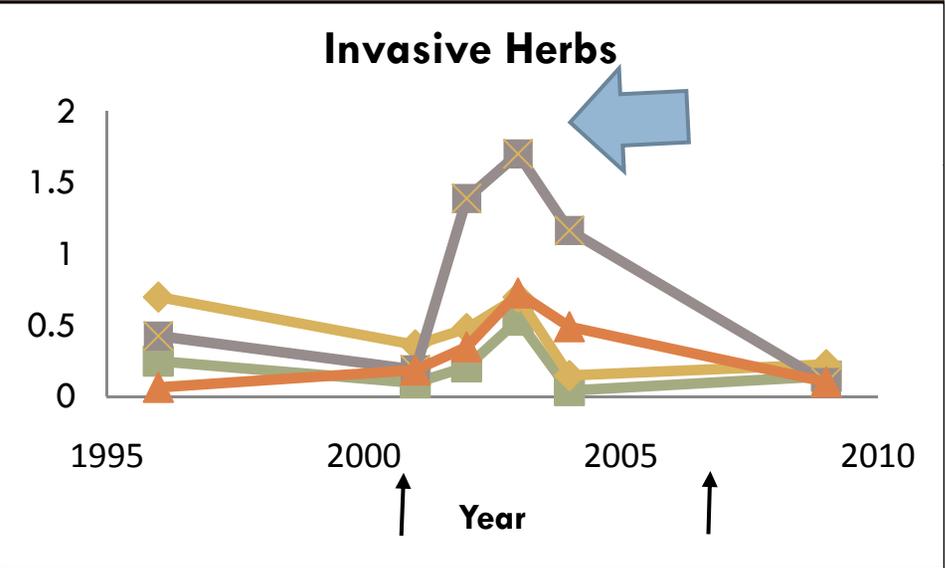
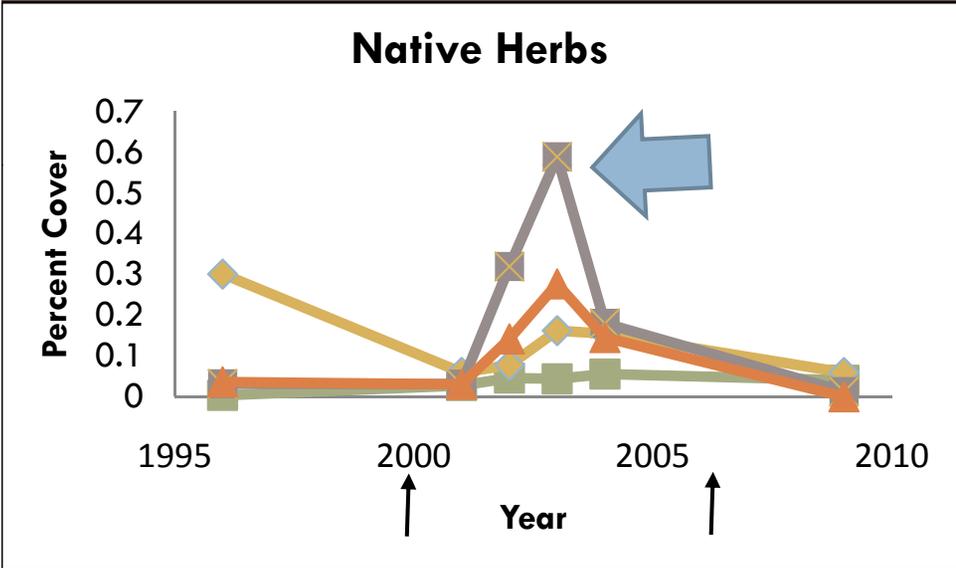
Total cover



Perennial Cover

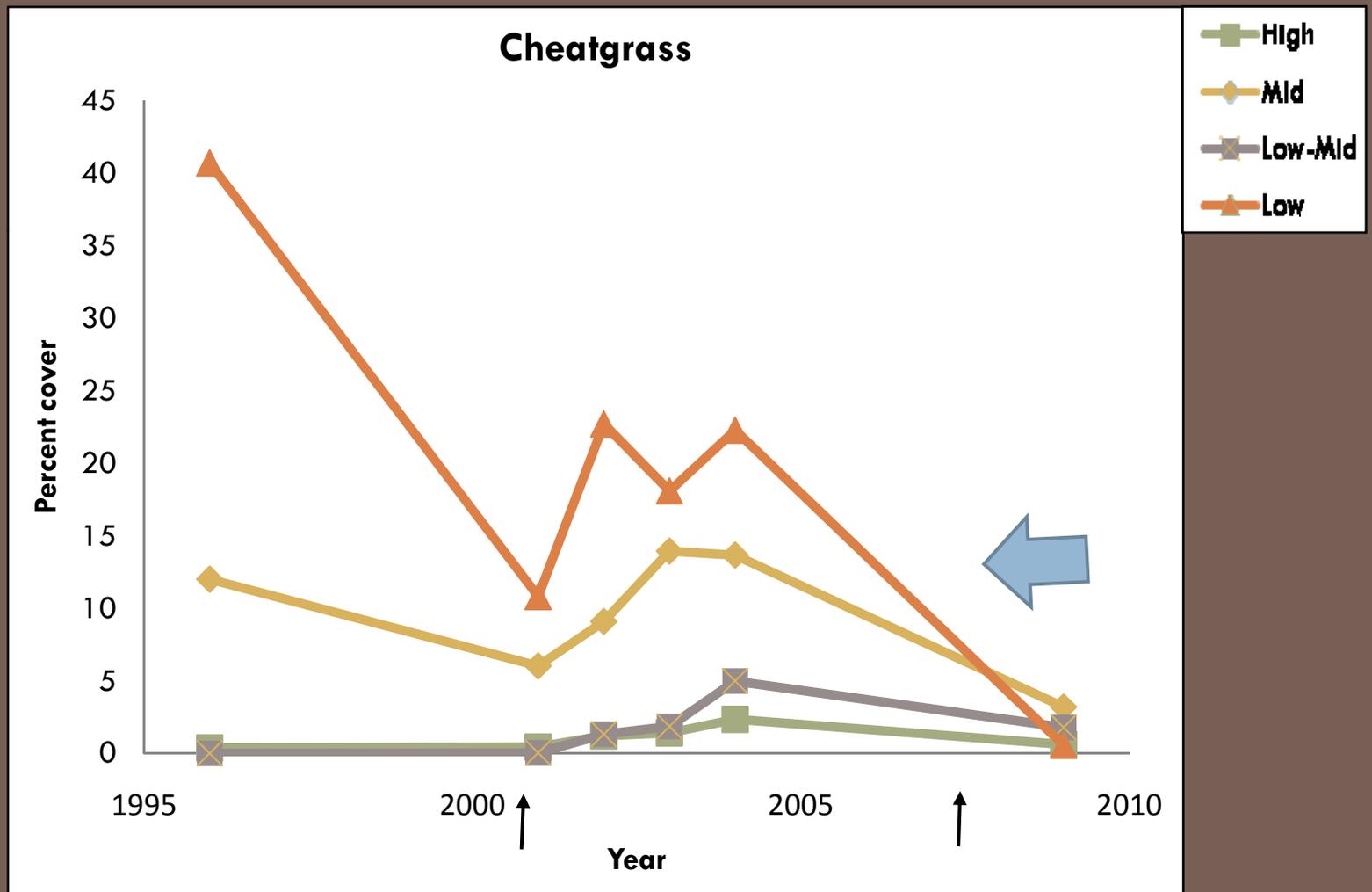


Annual Cover

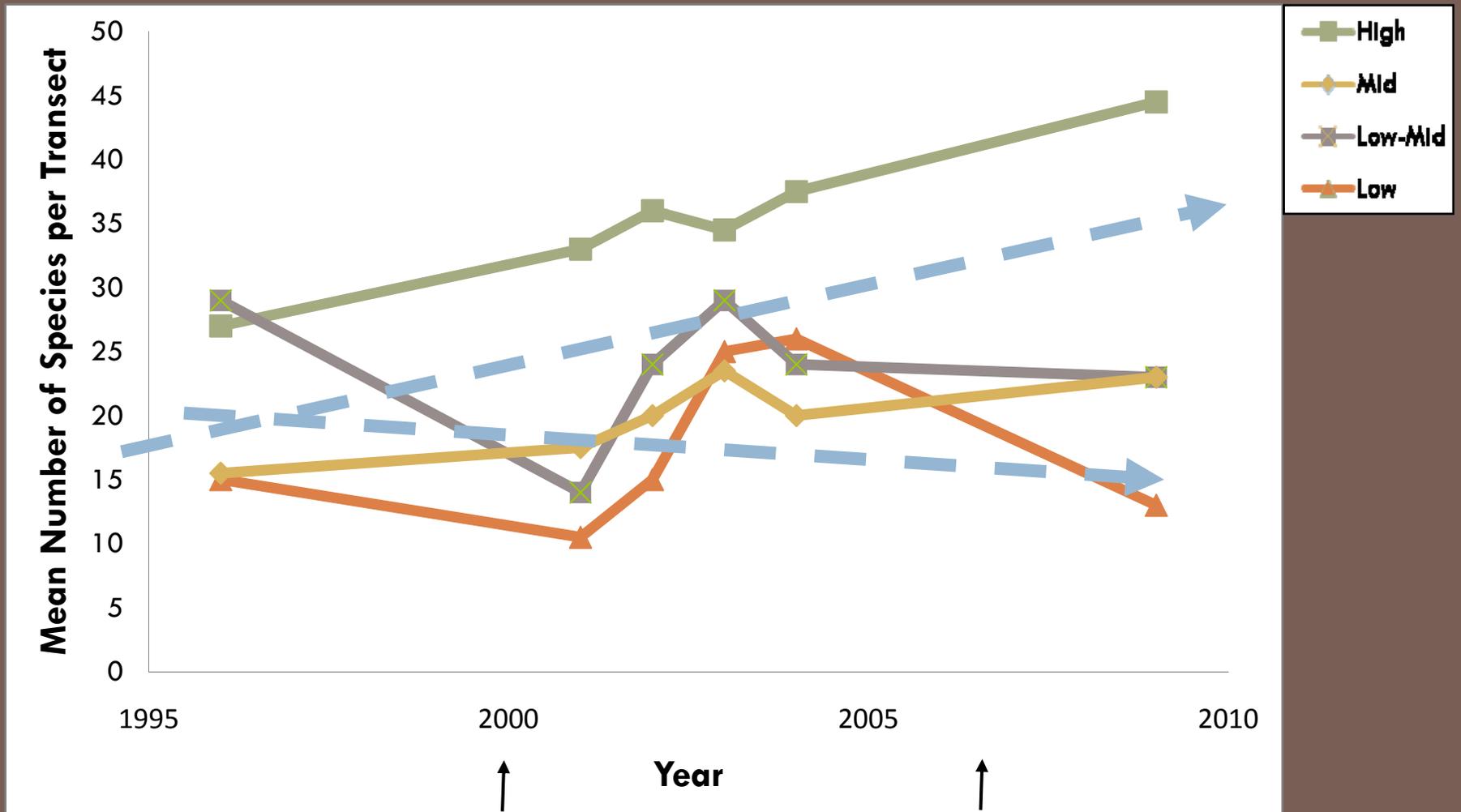


- High
- Mid
- Low-Mid
- Low

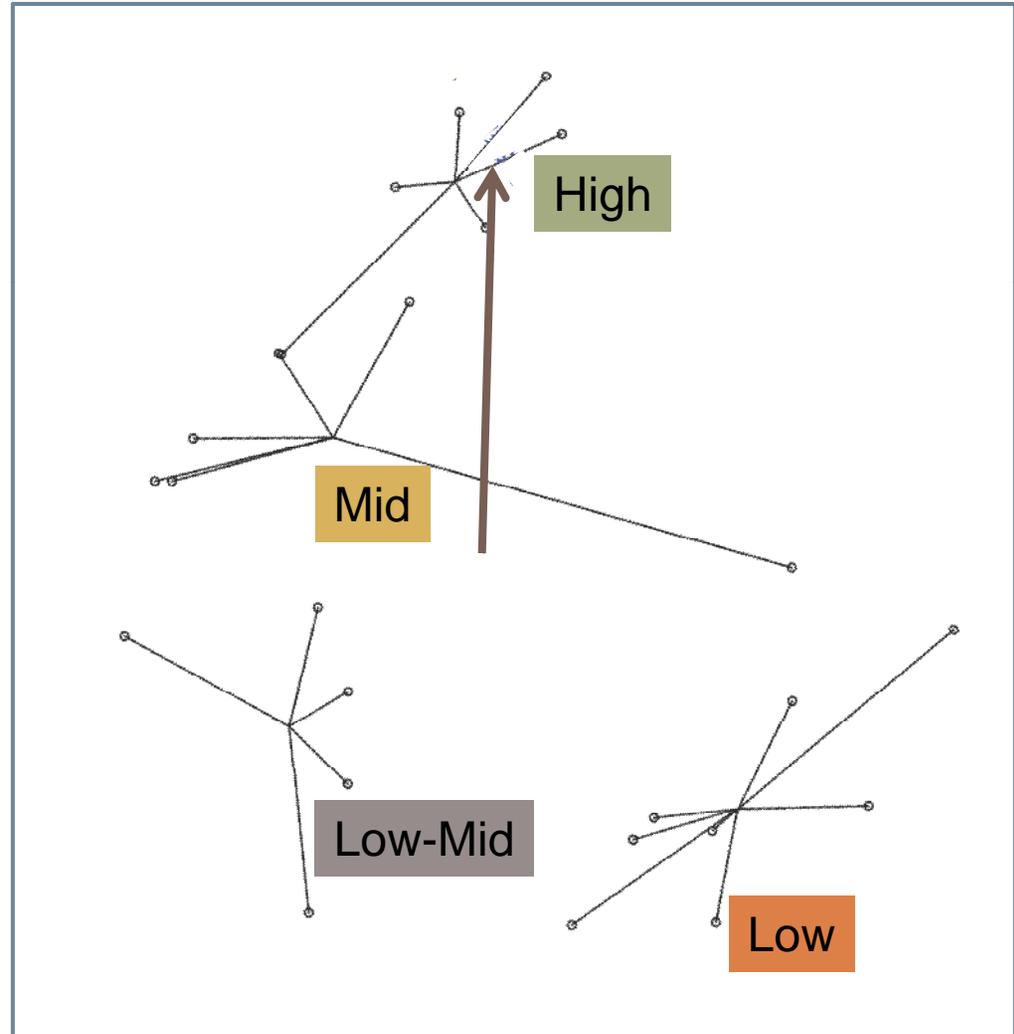
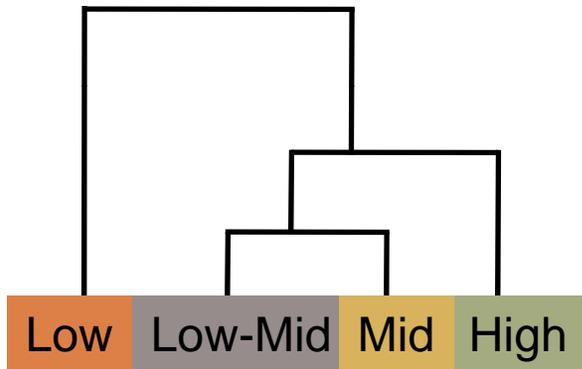
Annual Cover



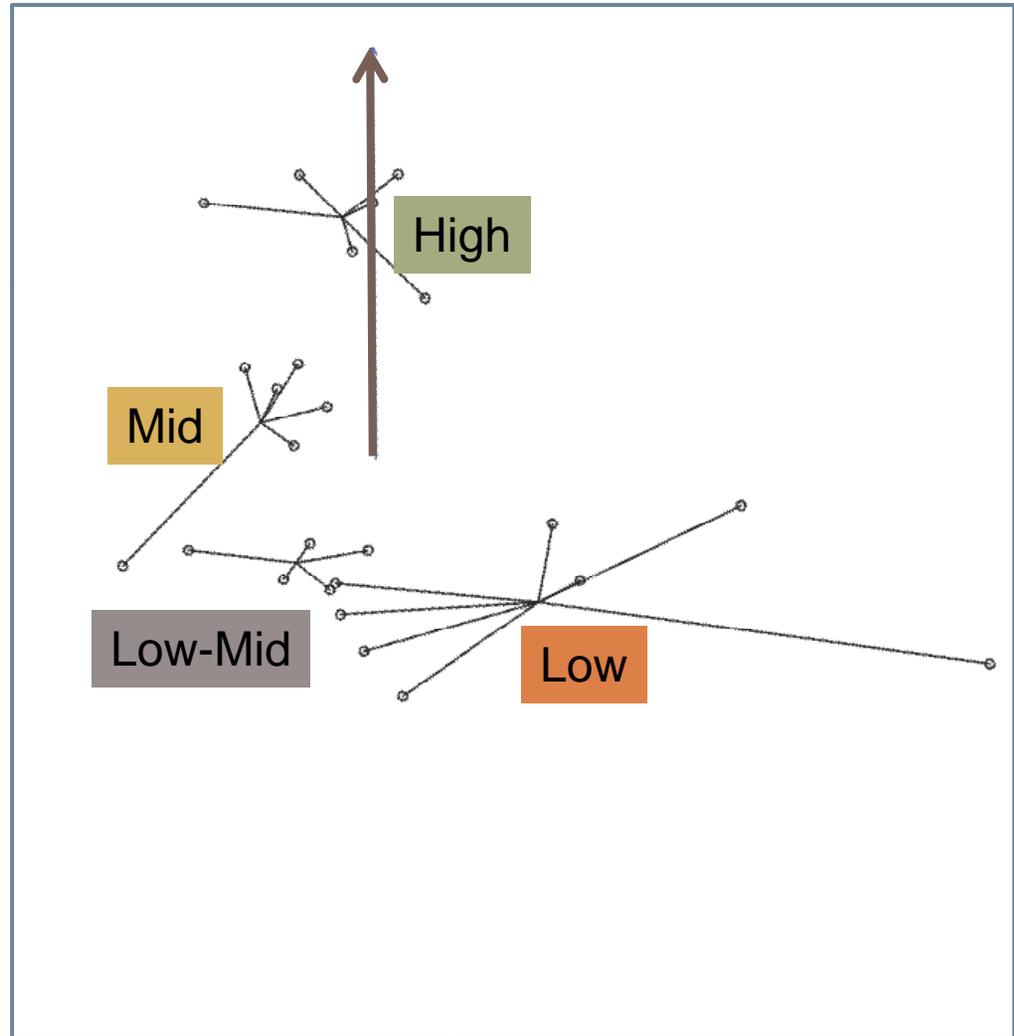
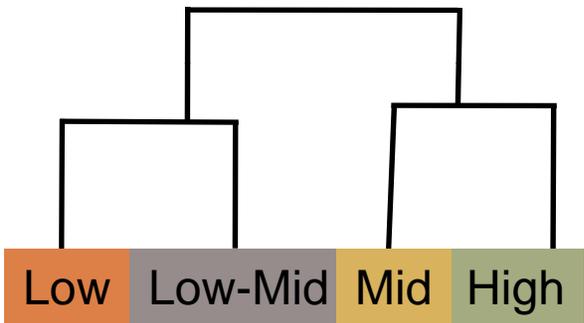
Native Species Richness



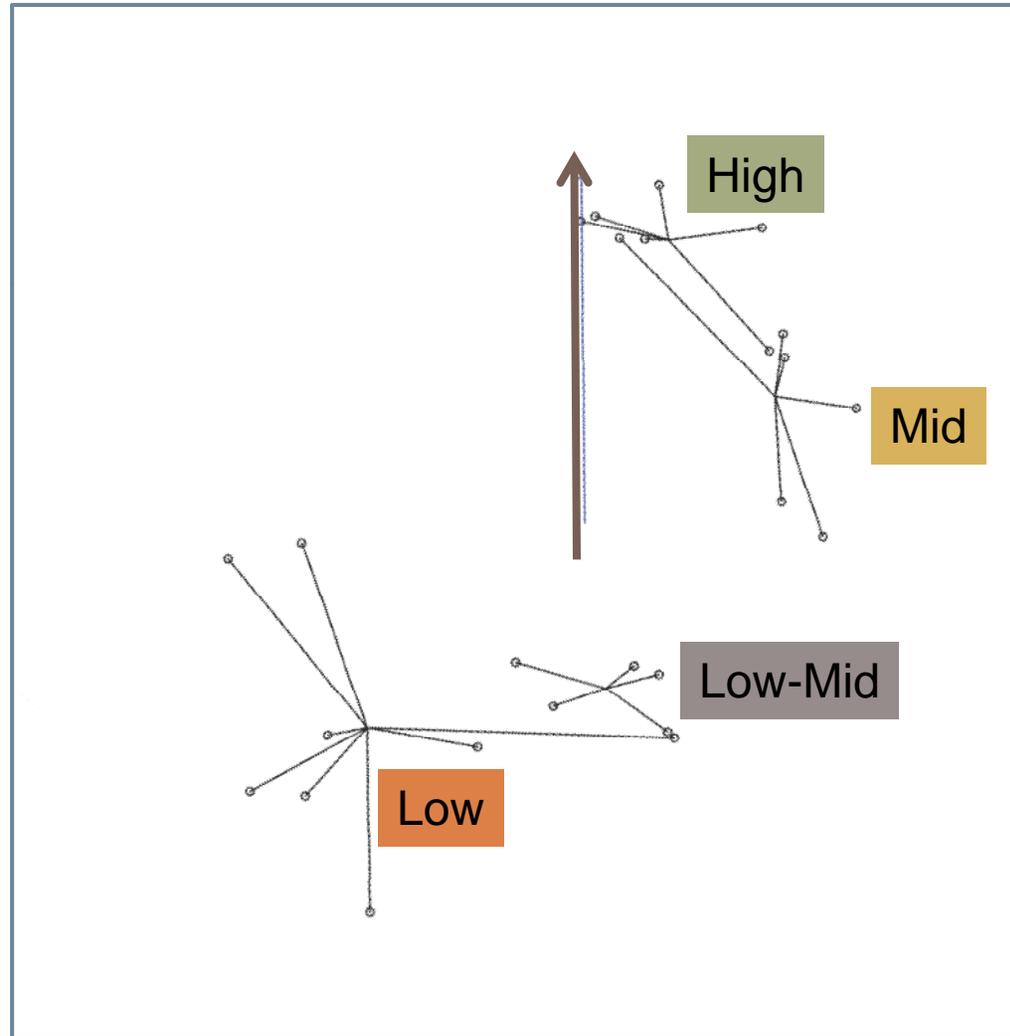
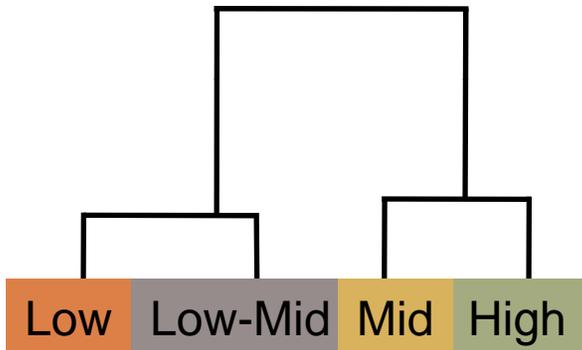
Pre-Fire (1996)



After One Fire (2002)



After Two Fires (2009)



Implications for Restoration



High Elevation Community



1996

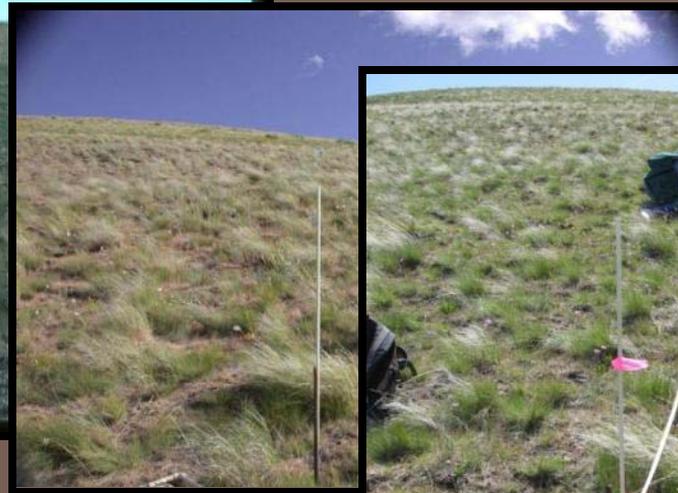
Festuca idahoensis - g
Poa secunda - g
Pseudoroegneria spicata - g
Artemisia tripartita - s

g = grass
s = shrub
h = herb



2001

Poa secunda - g
Pseudoroegneria spicata - g
Crepis atrabarba - h
Lupinus bingenensis - h



2004



2009

Poa secunda - g
Pseudoroegneria spicata - g
Festuca idahoensis - g
Poa cusickii - g

High Elevation Community

- Steep; difficult access
- Stony loam soils
- Short growing season
- Good degree of native species
 - ▣ Sagebrush resprouts
- Minimal restoration needed



Mid Elevation Community



1996

Pseudoroegneria spicata - g

Bromus tectorum - g

Poa secunda - g

Plantago patagonica - h

g = grass

s = shrub

h = herb



2001

Poa secunda - g

Bromus tectorum - g

Pseudoroegneria spicata - g

Lomatium grayi - h



2004



2009

Pseudoroegneria spicata - g

Poa secunda - g

Bromus tectorum - g

Phlox longifolia - s

Mid Elevation Community

- Loamy soils
- Good degree of native species
 - ▣ Native grasses
- Many invasives
 - ▣ Patchy distribution
- Appropriate sites for restoration



Low-Mid Elevation Community

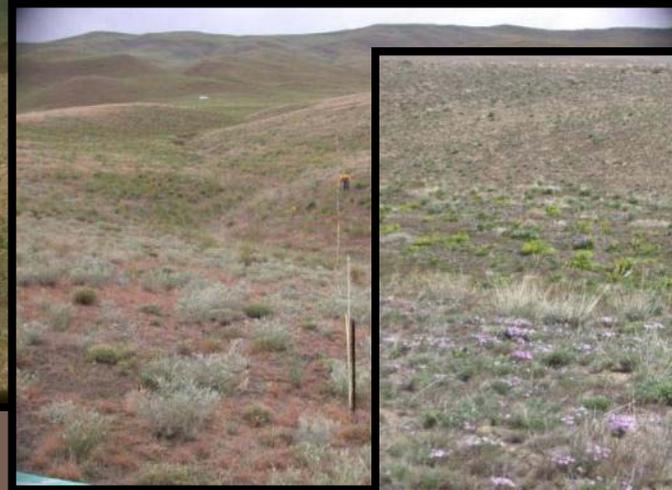


1996

Poa secunda - g
Artemisia tridentata - s
Machaeranthera canescens - h
Artemisia tripartita - s



2001



2004

Poa secunda - g
Sisymbrium altissimum - h
Descurainia pinnata - h
Draba verna - h



2009

Phlox longifolia - s
Poa secunda - g
Bromus tectorum - g
Salsola tragus - h

g = grass
s = shrub
h = herb

Low-Mid Elevation Community

- Broken landscape (aspect important)
- Loamy soils

- Becoming similar to low community
- Native dominated but low diversity
 - ▣ Native shrubs
- Some invasive species



Low Elevation Community



1996

Bromus tectorum - g

Artemisia tridentata - s

Poa secunda - g

Grayia spinosa - s

g = grass

s = shrub

h = herb



2001

Bromus tectorum - g

Salsola tragus - h

Poa secunda - g

Descurainia pinnata - h



2004



2009

Poa secunda - g

Bromus tectorum - g

Salsola tragus - h

Phlox longifolia - s

Low Elevation Community

- ❑ Cheatgrass – expect future fires
- ❑ Sandy soil – low soil moisture; wind
- ❑ Low degree of native species

- ❑ FWS isn't planting sagebrush in these areas



Protect Sagebrush Islands



Recent Restoration Activities

- Cheatgrass control
- Species mixes for sandy and loamy soils
 - ▣ Aerial vs. drill application



Conclusions

- Communities differ in response to fires
- Restoration must reflect these differences
 - ▣ The middle elevations need the work – they are being invaded but also still have pretty good cover of native species



Questions?

<http://depts.washington.edu/firesale/>
evadr@uw.edu

