

# Landscape-Scale Strategies For Invasive Plants

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**Global Invasive Species Team**  
&





**Cheatgrass (*Bromus tectorum*)**



**Red brome (*Bromus madritensis* subsp. *rubens*)**

*Cenchrus ciliaris* (Buffelgrass)





*Buffelgrass (Cenchrus ciliaris)*



*Lehmann's lovegrass (Eragrostis lehmanniana)*



*Tamarix* species (Tamarisk)





# Conservation Goals

# Conservation Objectives

**(What are we managing for?)**



← Montane conifers

Semi-desert grassland



Chaparral / Mountain Mahogany ↑

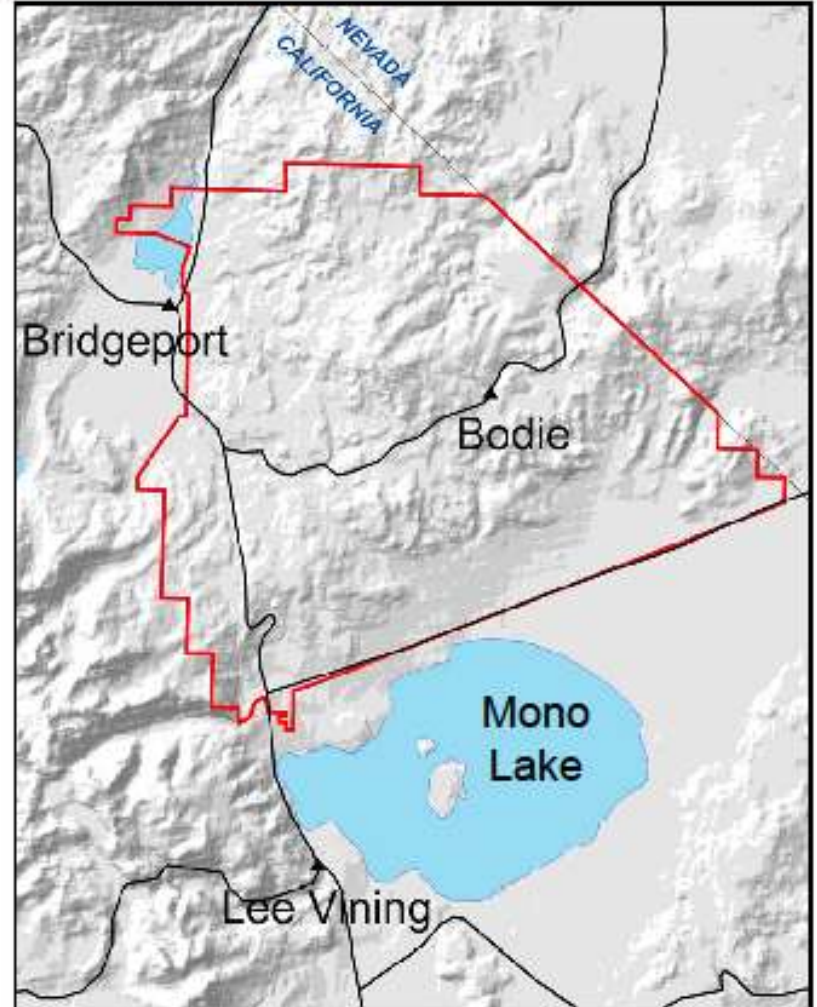
Dunes / mesquite →



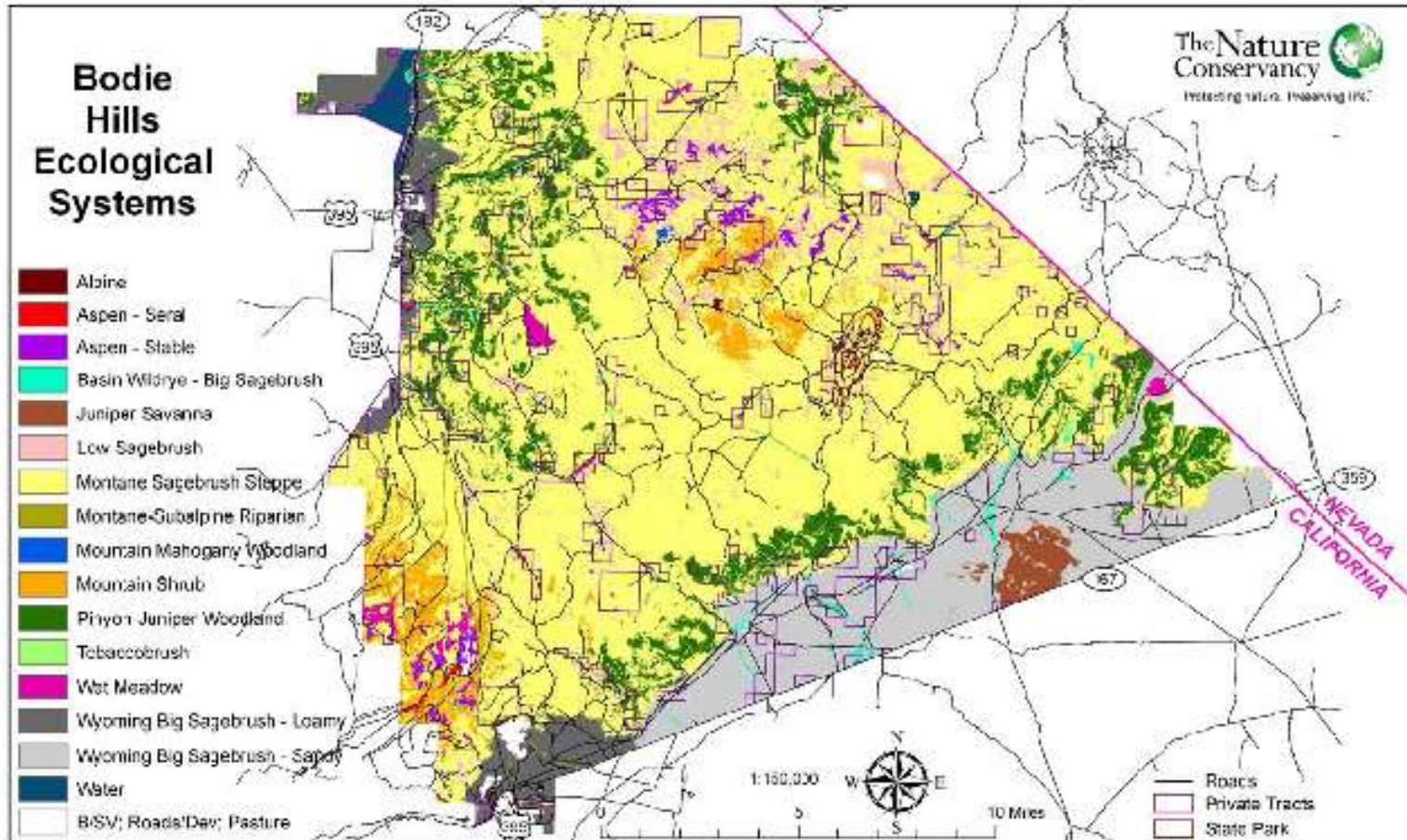
- Identify and protect uninvaded areas
- Identify high value areas for Restoration
  - ✓ Fire/fire prevention & suppression
  - ✓ Herbicides
  - ✓ Biocontrol & biopesticides
- ....And for 'Rehabilitation'  
(learning to live with invaders)
  - ✓ Restoration plantings with competitive natives



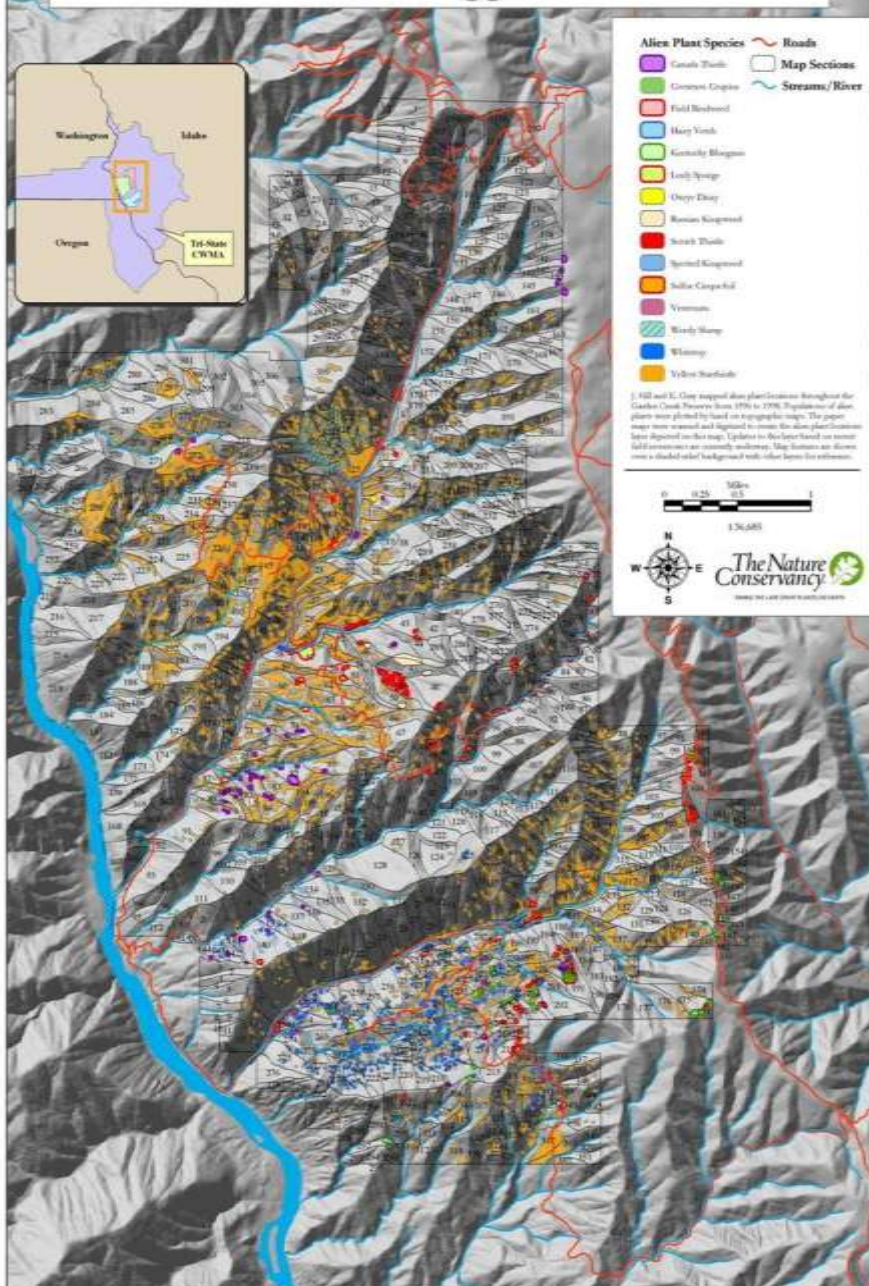
**Bodie Hills**  
~ 192,000 acres



# 15 Biophysical Settings = Conservation Targets



# Garden Creek Preserve Aggressive Alien Plants



# Management Tools

**Fire/Fire Prevention/Suppression**

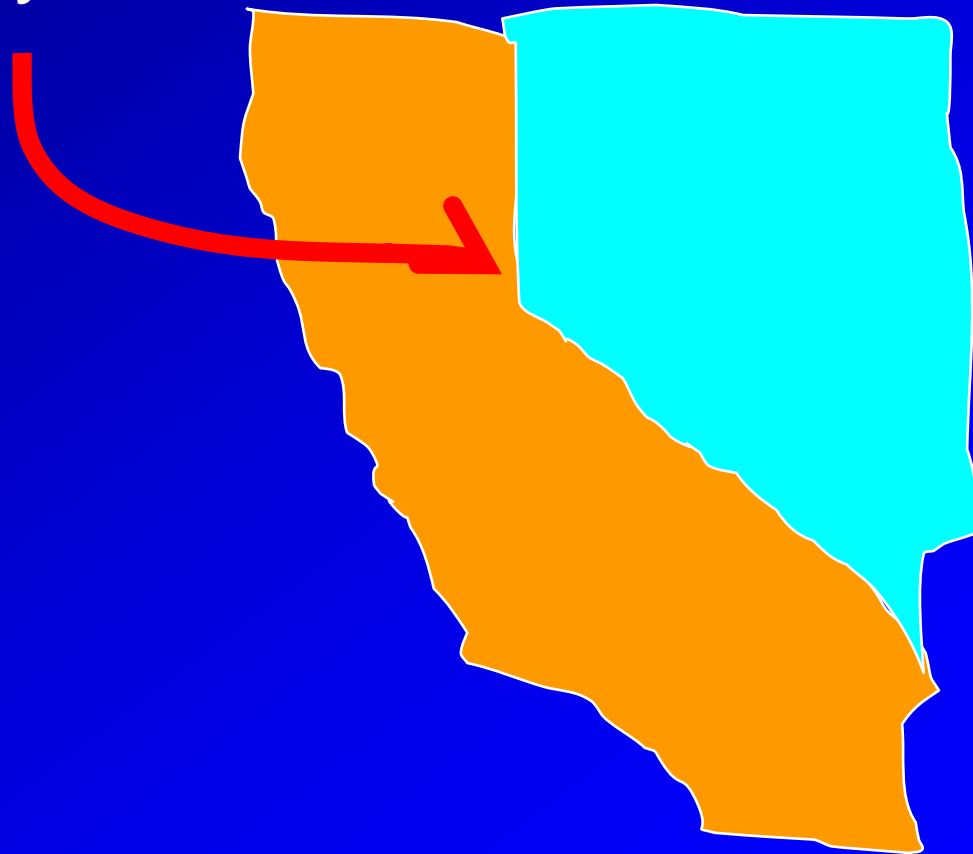
**Herbicides**

**Biocontrol & Biopesticides**

**Restoration Plantings**

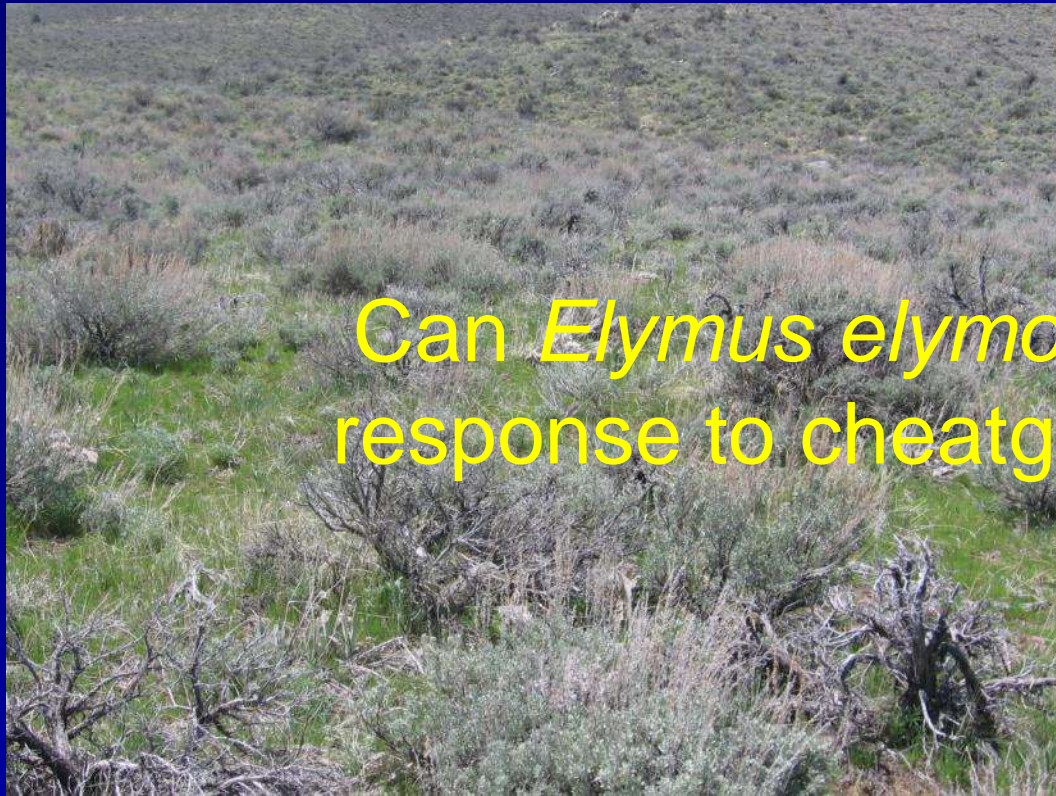
# Beth Leger, U. Nevada, Reno

Balls canyon

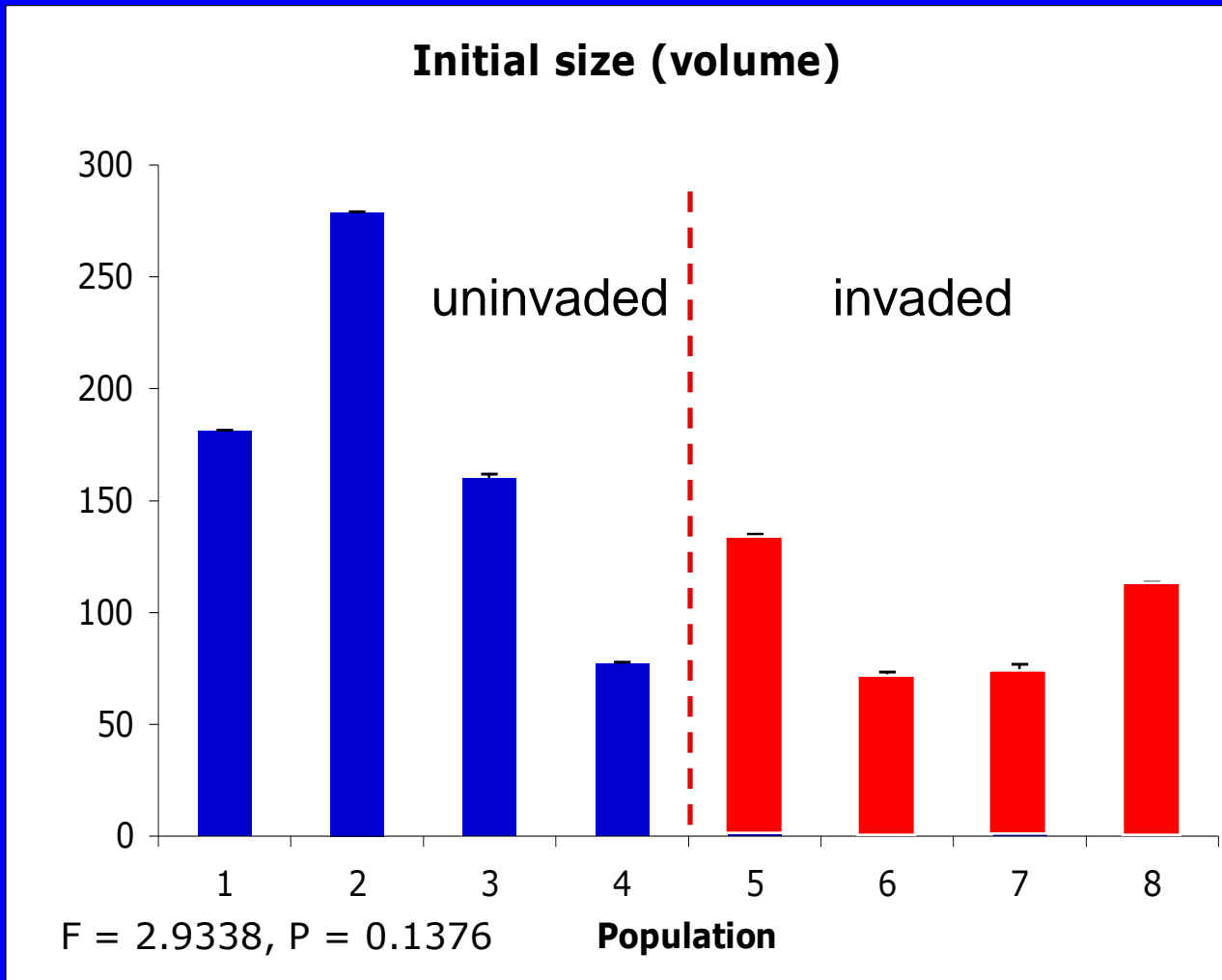




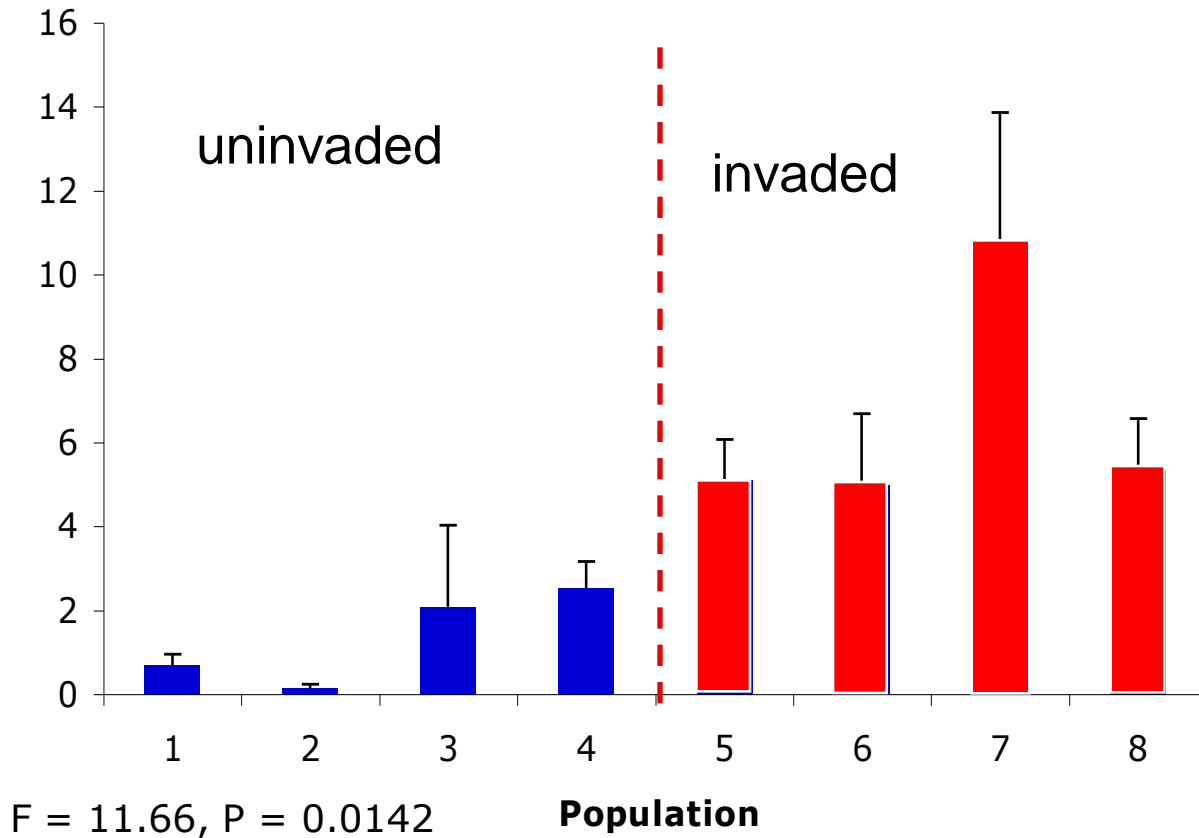
Can *Elymus elymoides* evolve in response to cheatgrass invasion?



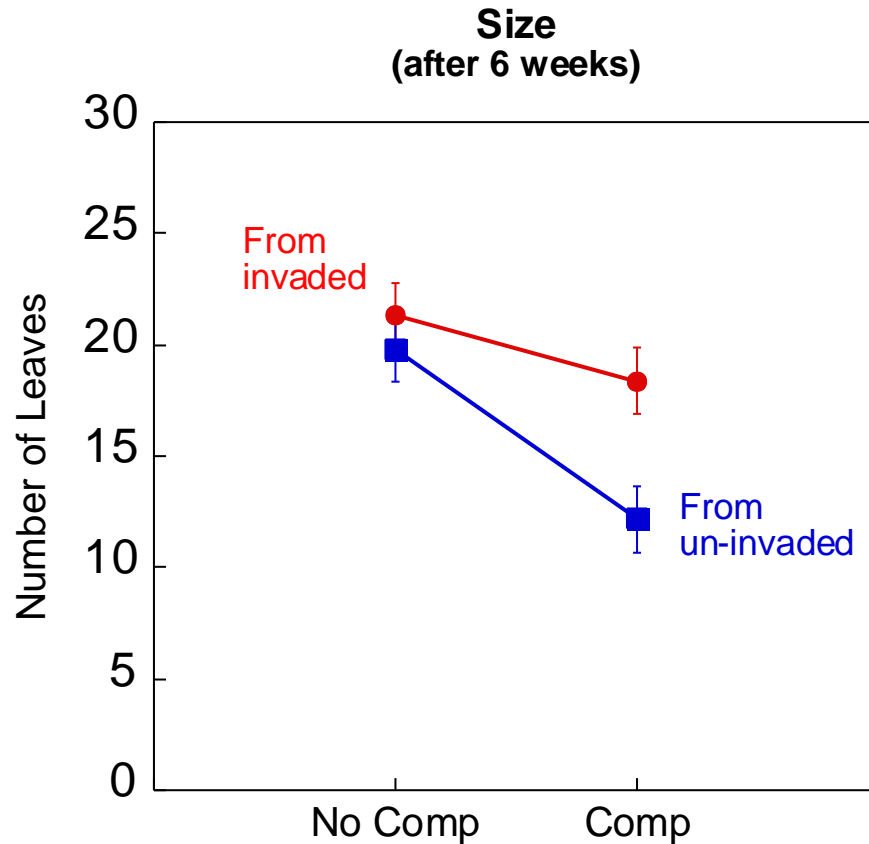




### Number of leaves after one week

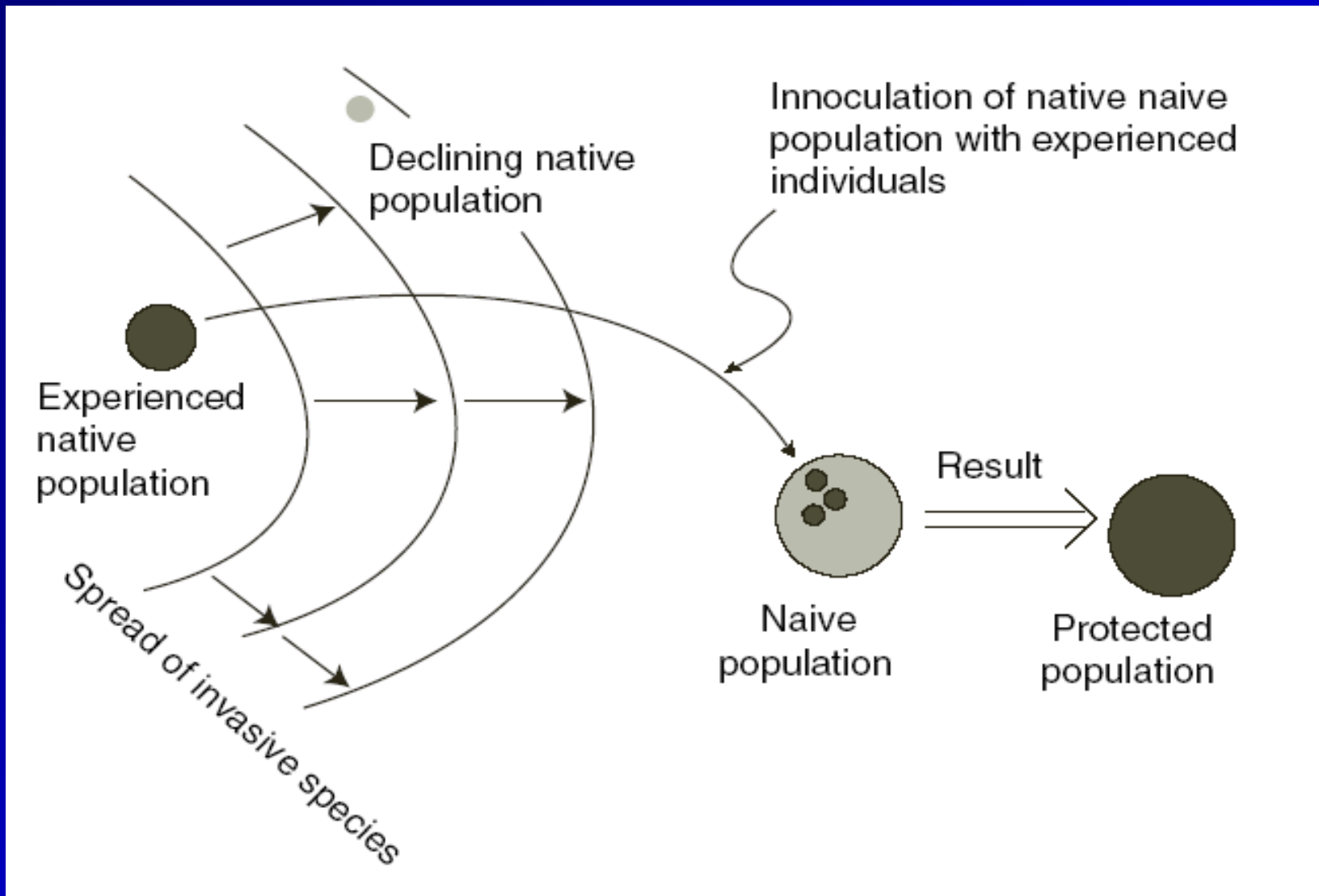


# Plants collected from invaded sites do better under competition



Comp:  $P = 0.0004$   
Interaction:  $P = 0.0884$

Also see:  
Nasri and Doescher. 1995  
J. Range Management.....



**Schlaepfer, Sherman, Blossey and Runge. 2005.  
Introduced species as evolutionary traps.  
Ecology Letters 8: 241-246**

# Great Basin, Mojave & Sonoran Deserts

- Lower and middle elevation vegetation evolved with infrequent Fire.
- Cheatgrass, red brome, buffleggrass and others are widespread and cause uncharacteristic (frequent) fires at these elevations now.

# Great Basin, Mojave & Sonoran Deserts

Map UNINFESTED AREAS and PROTECT THEM FROM FIRE

Map high value areas and restore them

- Locate and mass produce competitive native plants

- Research and Development of Biocontrol or Biopesticides

- Test 'newer' herbicides (e.g.



Tamarisk biocontrol.....now what?

Fire?

Native plant restoration?

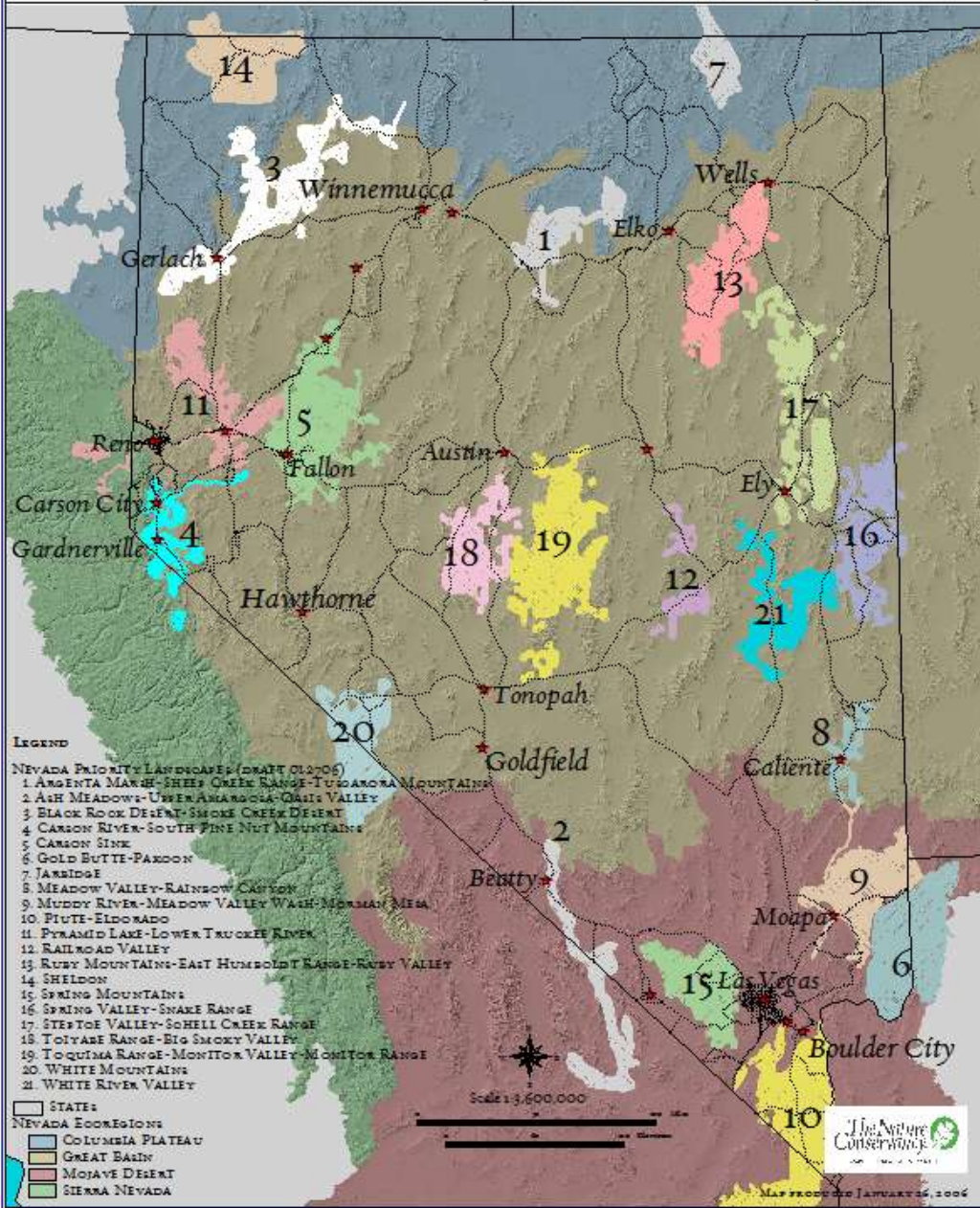






# THE NATURE CONSERVANCY OF NEVADA

## PRIORITY LANDSCAPES (DRAFT, JANUARY 2006)



# 2007 Summary of The Nature Conservancy projects around the world

- 921 projects
- 517 listed INVASIVE SPECIES as threats (56%)
- Far more than any other threat
  - number 2 threat : Residential & Commercial Development : Housing & Urban Areas with “just” 421 (46%).

# IMPACTS

- **Ecosystem Level Impacts**
  - Fire Frequency & Intensity
  - Hydrology
  - Geomorphological Processes (erosion, sedimentation)
  - Soil Chemistry & Nutrient Cycles
- **Community & Population Level Impacts**
  - Vegetation Structure
  - Community Composition
  - Competition for Resources (light, water, nutrients)
  - Toxic to Native Plants or Animals
  - Promote Non-native Invasive Animals
  - Reduce Recruitment of Natives (Succession)
  - Vector pathogens and pests (e.g. chestnut blight vectored by Asian chestnut)
- **Genetic Impacts**
  - Hybridization with Native Species
- **Lack of Impacts**
- **Positive Impacts**



**Cheat grass (*Bromus tectorum*)**