

# Are plant conservatism scores a useful tool for evaluating condition of plant communities in the Black Hills?

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Northern Great Plains Inventory & Monitoring Network

Black Hills Area Botanist and Ecologist Workshop

March 2014



# Northern Great Plains Inventory & Monitoring Program monitors vegetation communities in 4 parks in the Black Hills

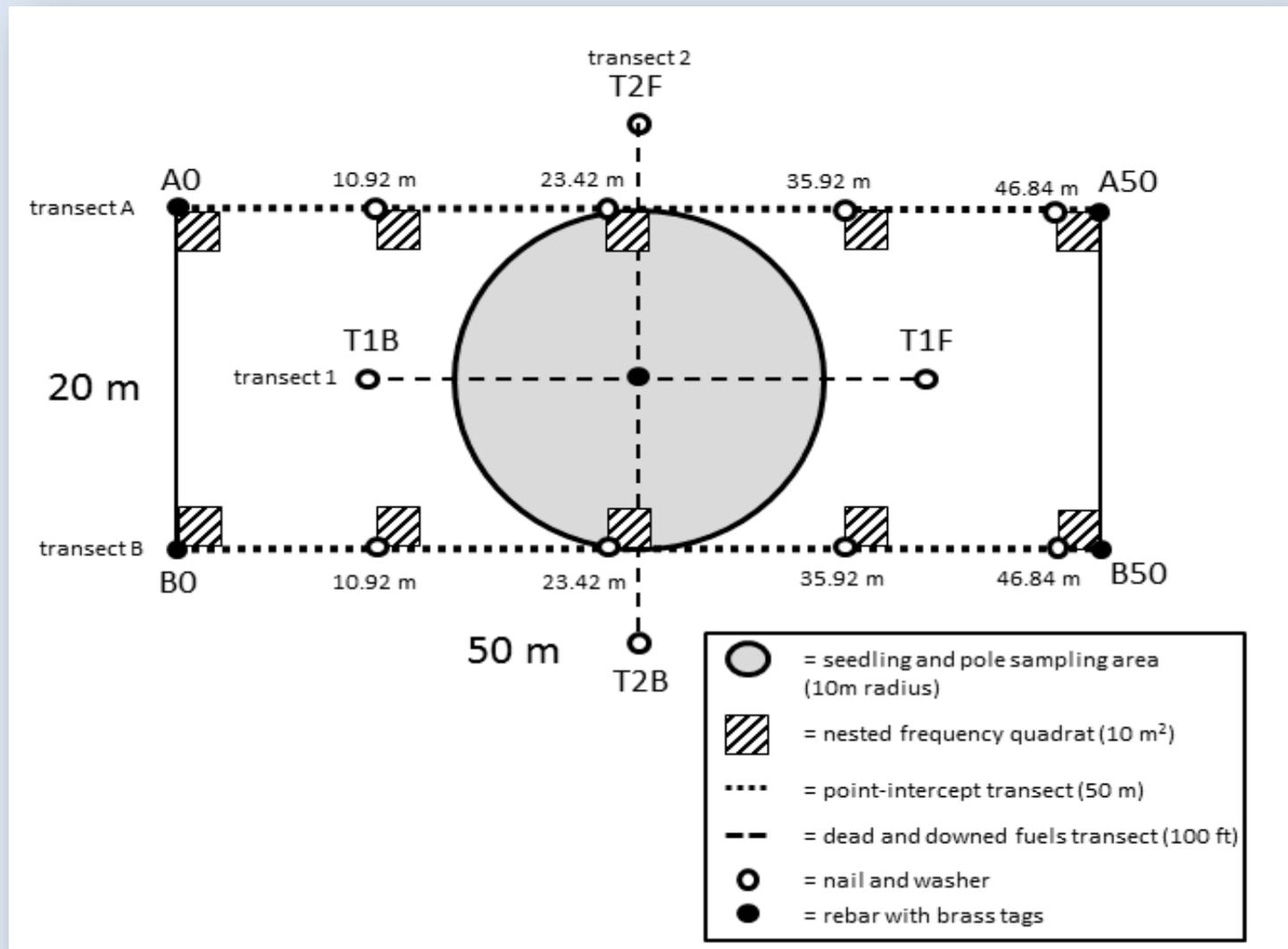


- Mount Rushmore National Memorial (MORU)
- Jewel Cave National Monument (JECA)
- Wind Cave National Park (WICA)
- Devils Tower National Monument (DETO)

# Forest condition is assessed every 5 years in 60-90 plots per park



Understory plant community composition and structure is measured at 6 to 15 plots per year in each park



Plant species composition was measured in 10  
1m<sup>2</sup> quadrats at each plot from 2011-2013



# Plant community data are reported using standard metrics in plant ecology and compared to a reference condition

- Species Richness
- Species Diversity
- Evenness
- Relative Cover of Exotic Species

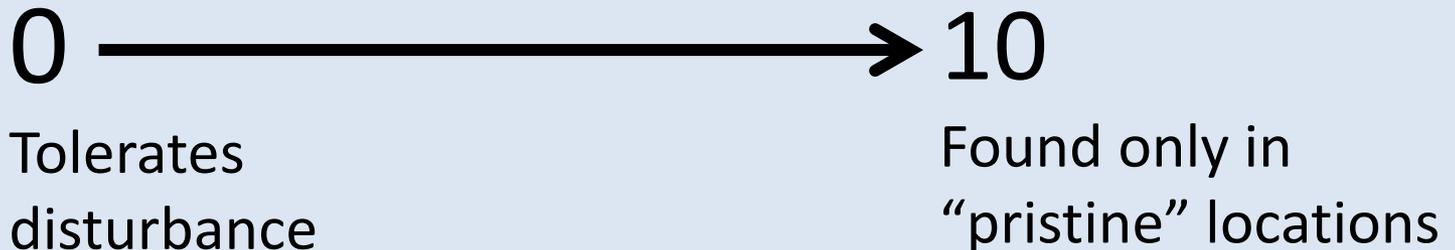
Specific Measures	2013 Value (mean $\pm$ SE)	Reference Condition	Condition Status/Trend
Relative cover of exotic species	27 $\pm$ 5.3 %	$\leq$ 10 % cover	

**Are plant conservatism scores a useful tool for  
evaluating condition of plant communities in  
the Black Hills?**

# Coefficient of Conservatism

Index from 0 to 10 indicating the “conservatism” of a species within a specific geographic area

- includes tolerance to disturbance
- determined by expert opinion based on observed patterns of occurrence in the geographic area
- exotic species = 0 for calculations



# Mean C score is an index of biotic integrity

- Mean C score =  $(\sum \text{coefficients}) / S$   
S = number of species present



# Assigning C scores to NPS data

- 377 species recorded in 3 years at 4 parks
- Colorado C scores— 90% of records
- South Dakota (excludes Black Hills) or Nebraska scores for species without Colorado scores
- Exotic species=0
- Used professional judgment for the rest of species (~1%)
- C scores were consistent across all 4 parks

# All values of C were present in the dataset



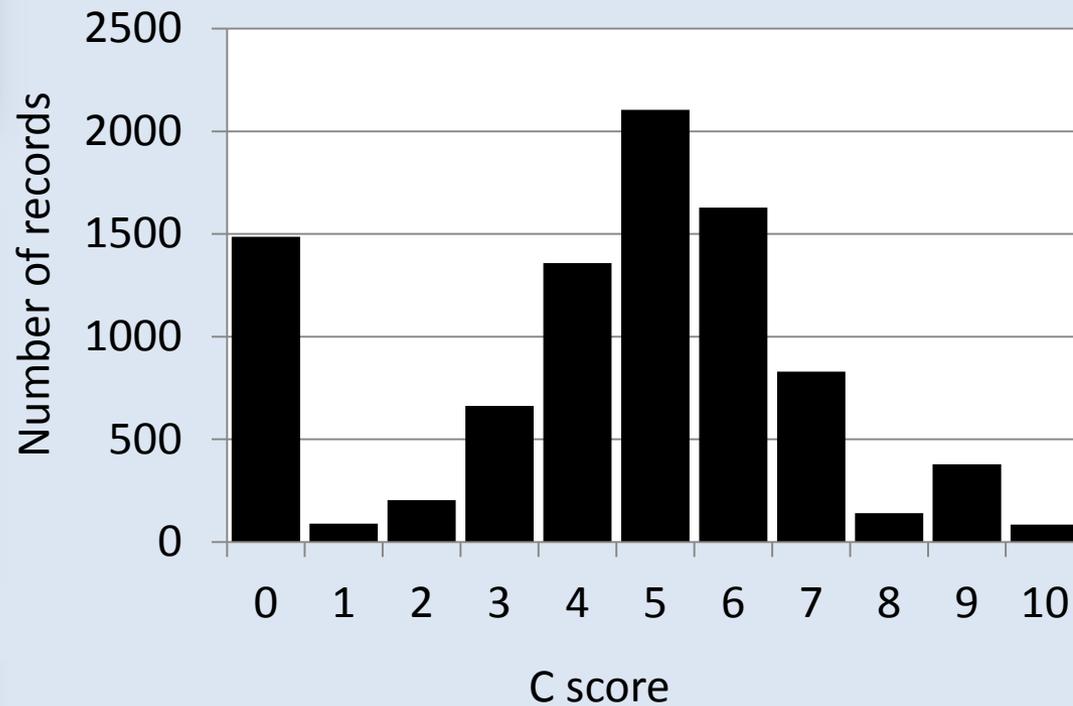
Canada Thistle



pepperweed



annual sunflower



Indiangrass



leadplant

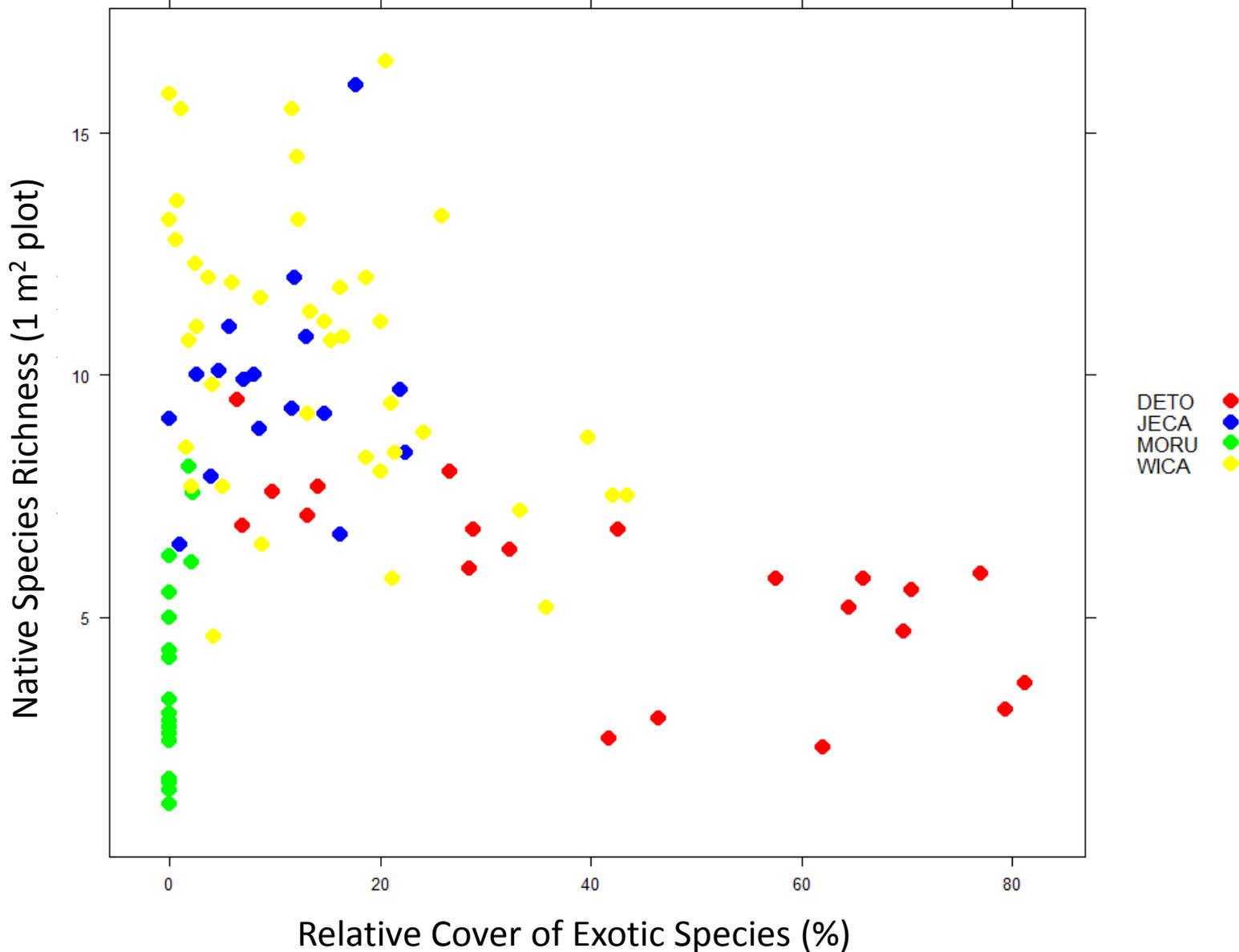


Richardson's alumroot

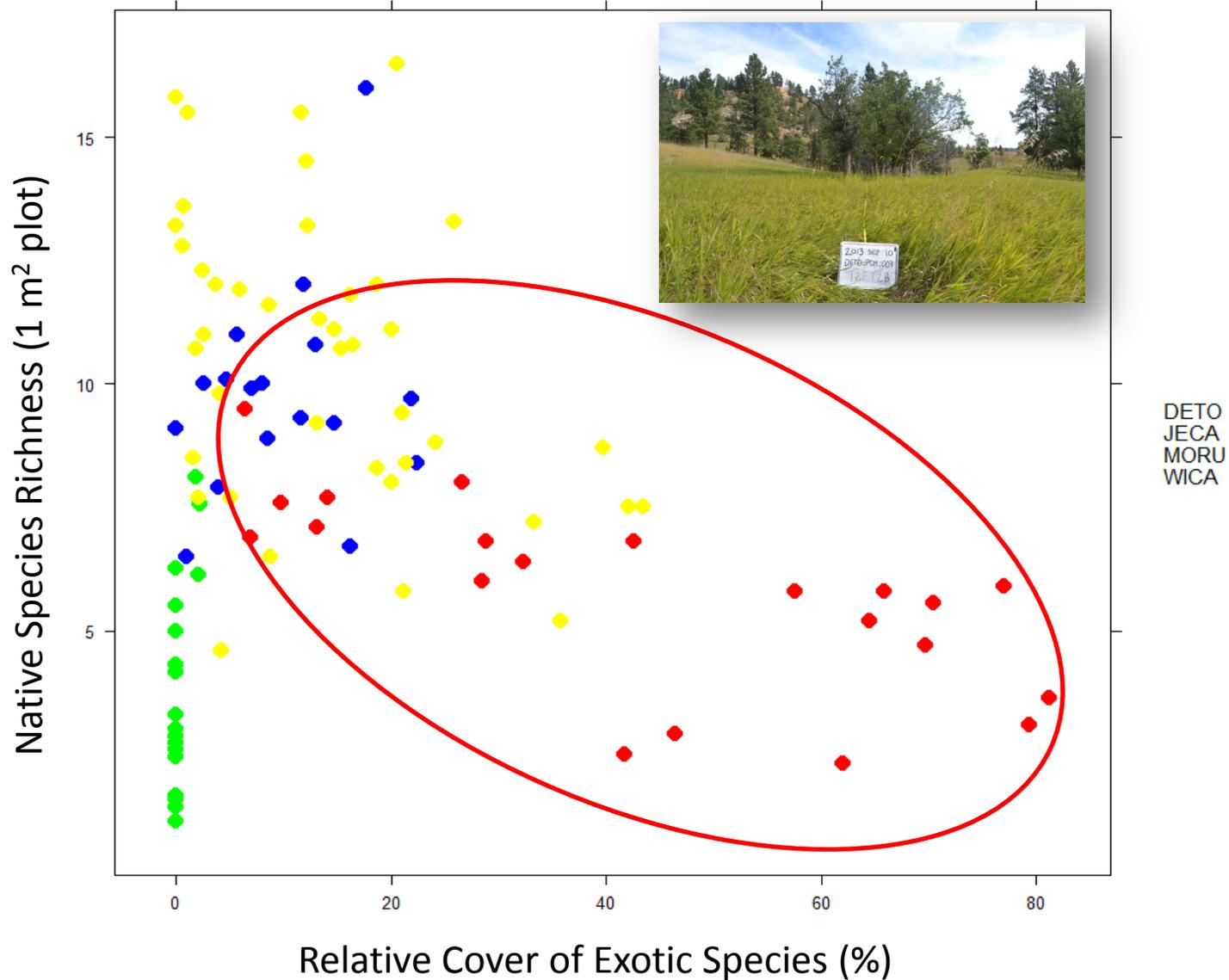
# Patterns of native richness, exotic cover, and mean C



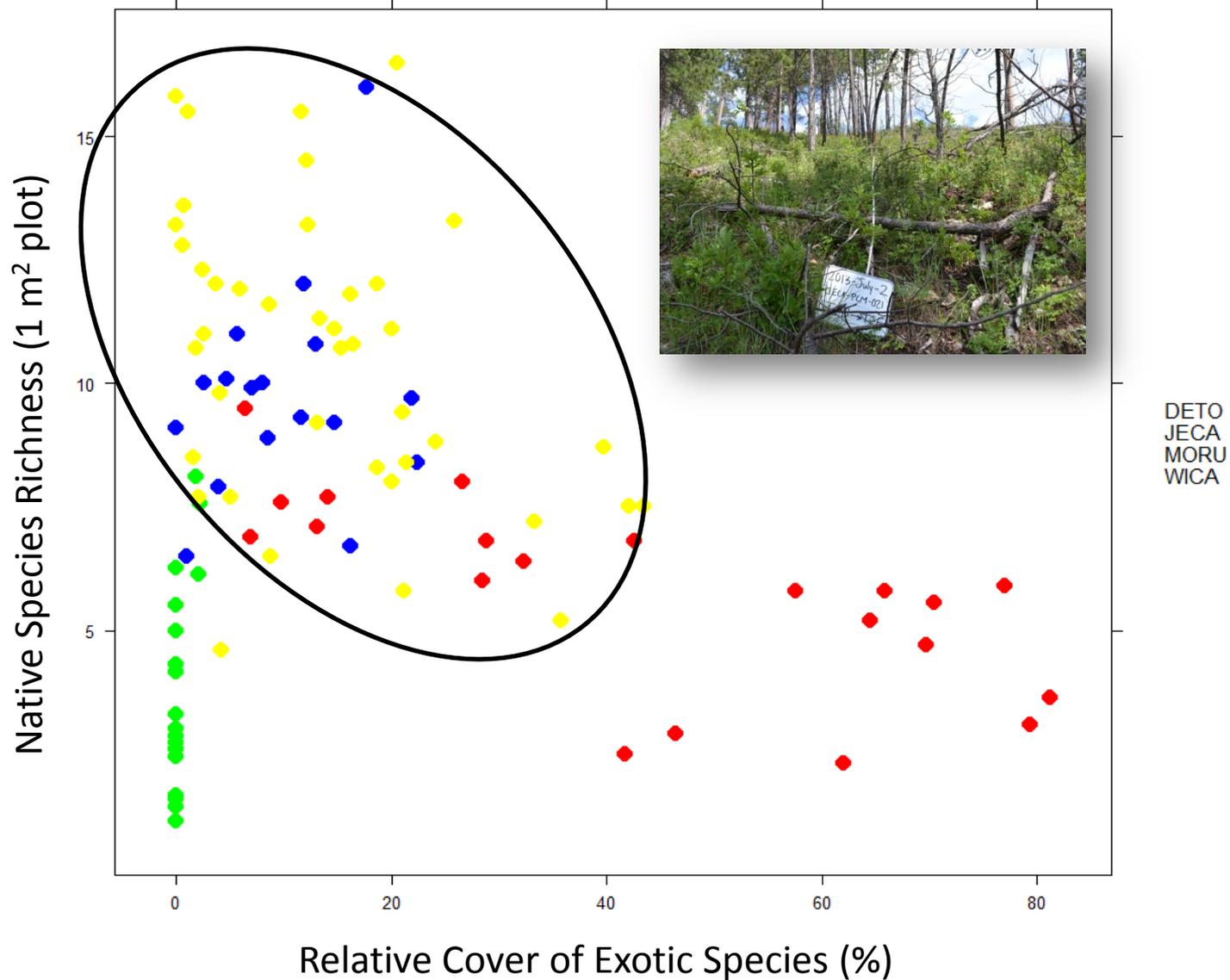
# Understory native species diversity declines with increasing exotic species cover



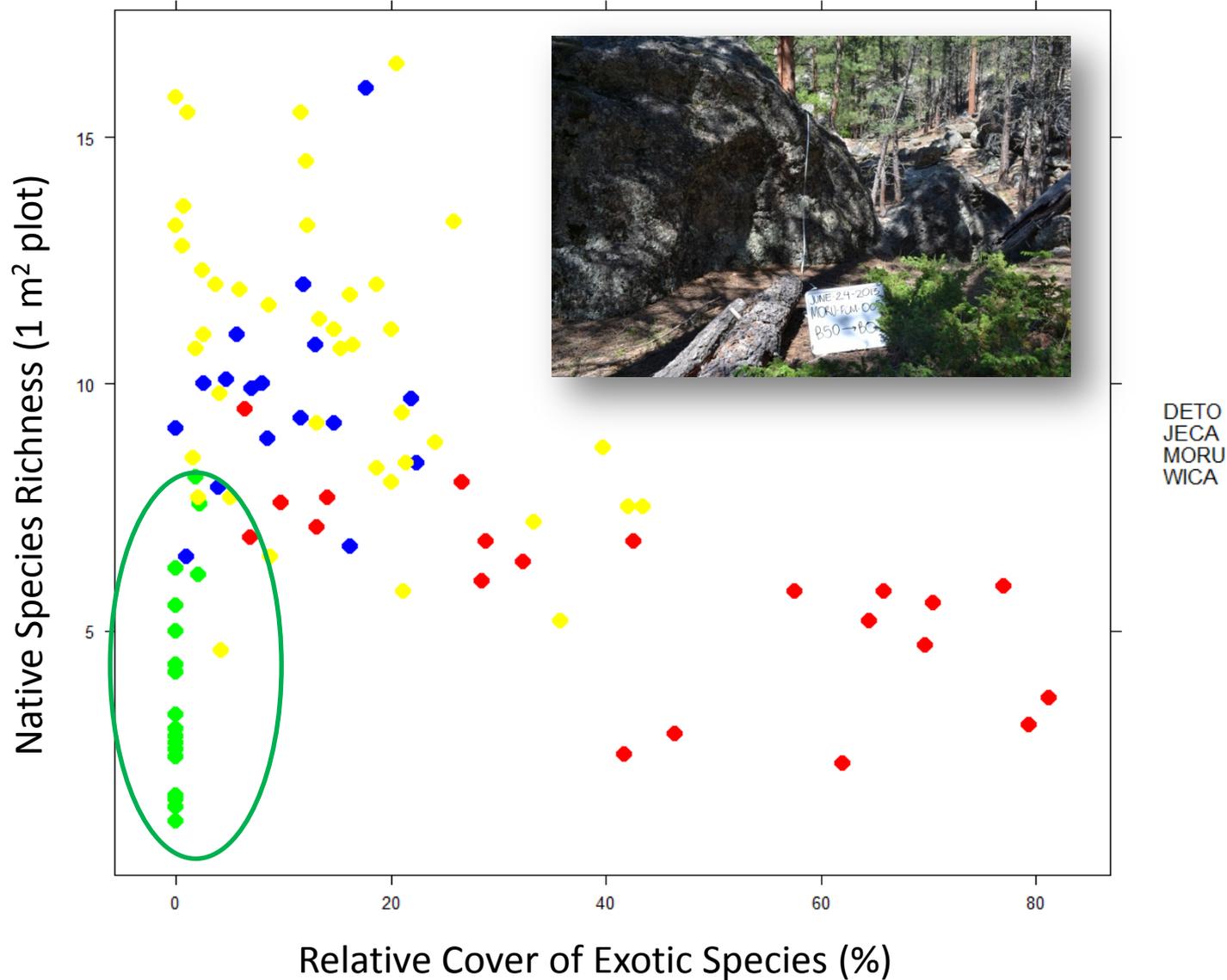
# Devils Tower NM has a high cover of exotic species



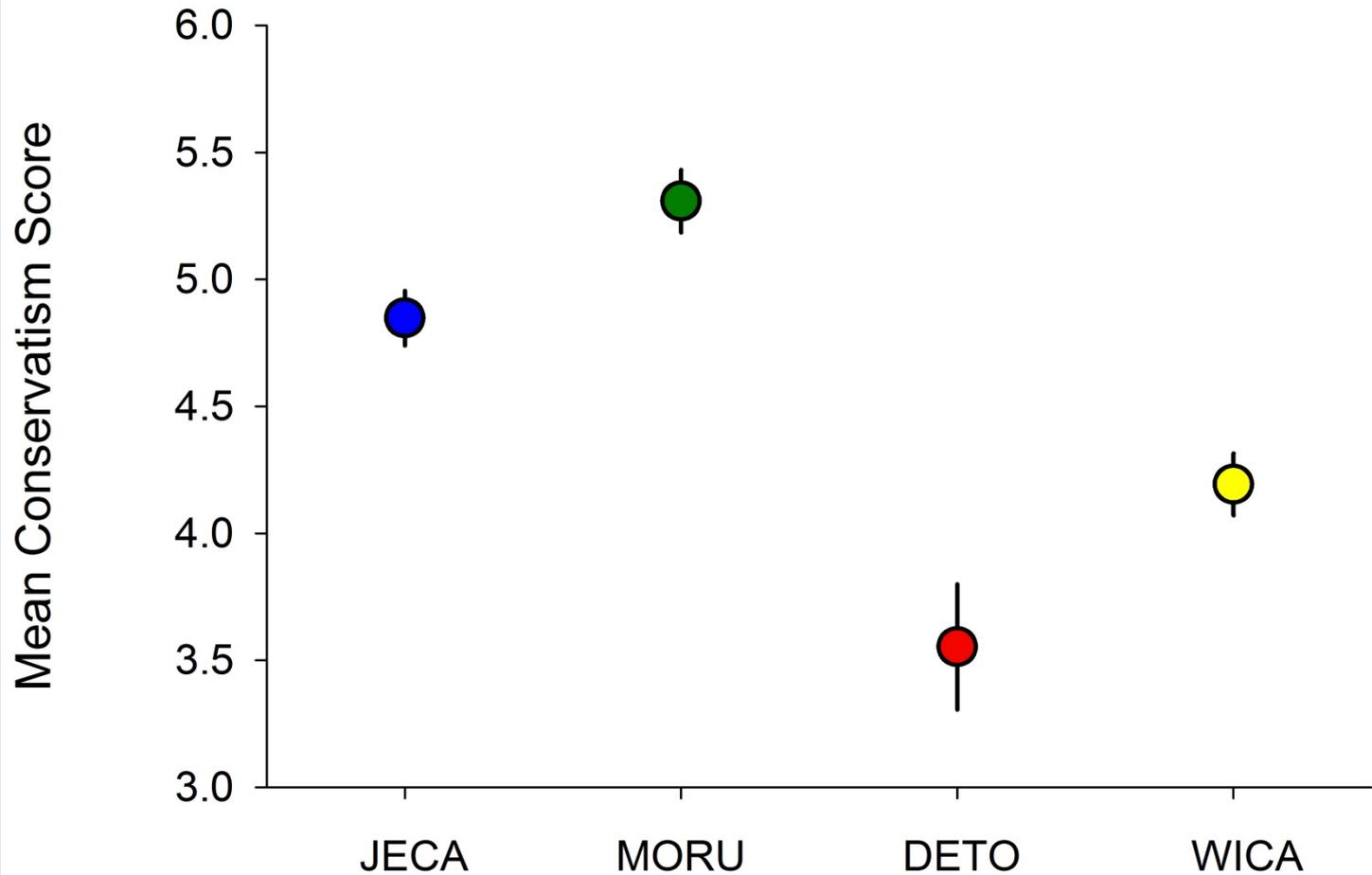
# Wind Cave NP and Jewel Cave NM have high understory species richness



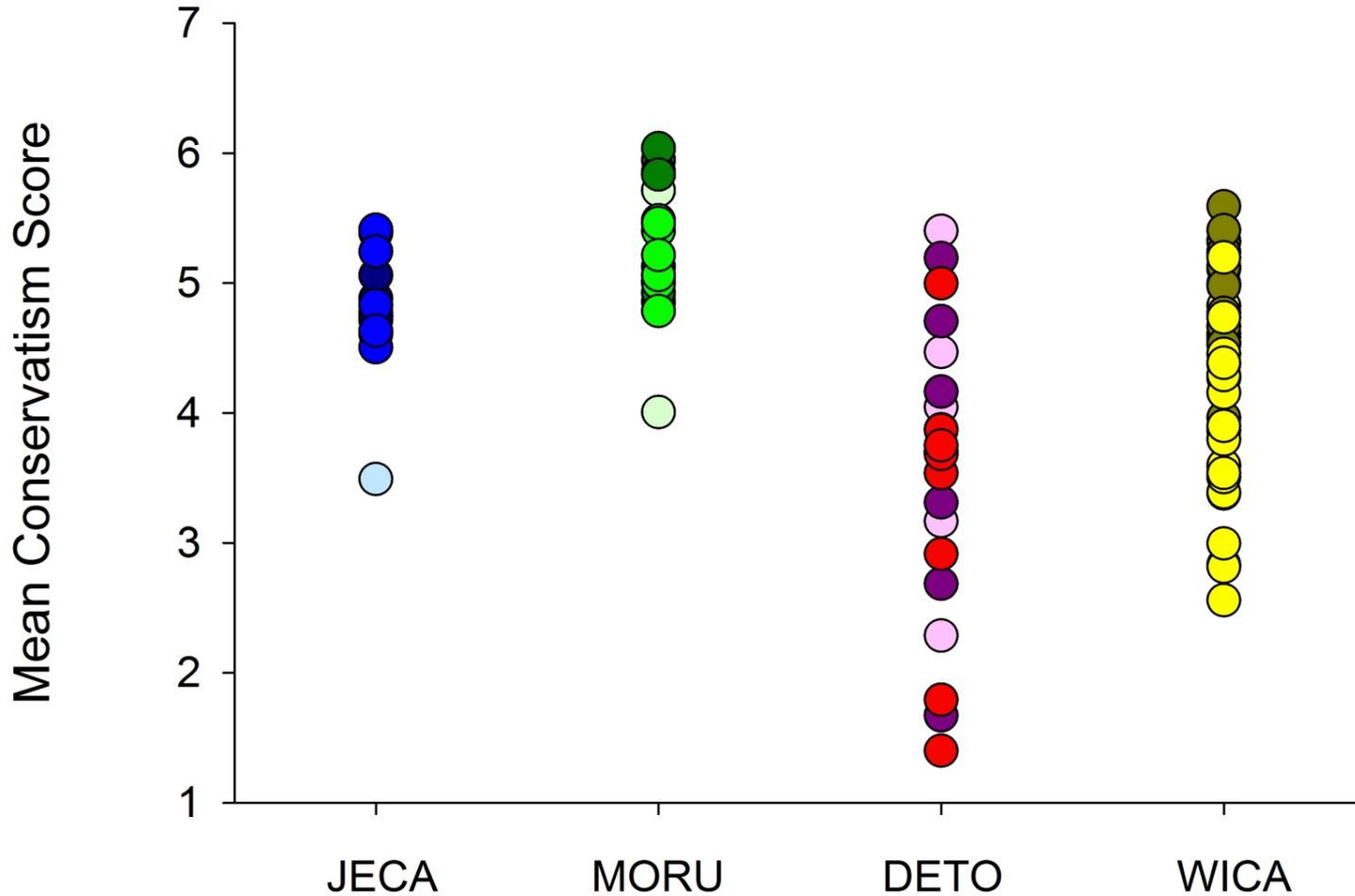
# Mount Rushmore has relatively few plant species in the understory



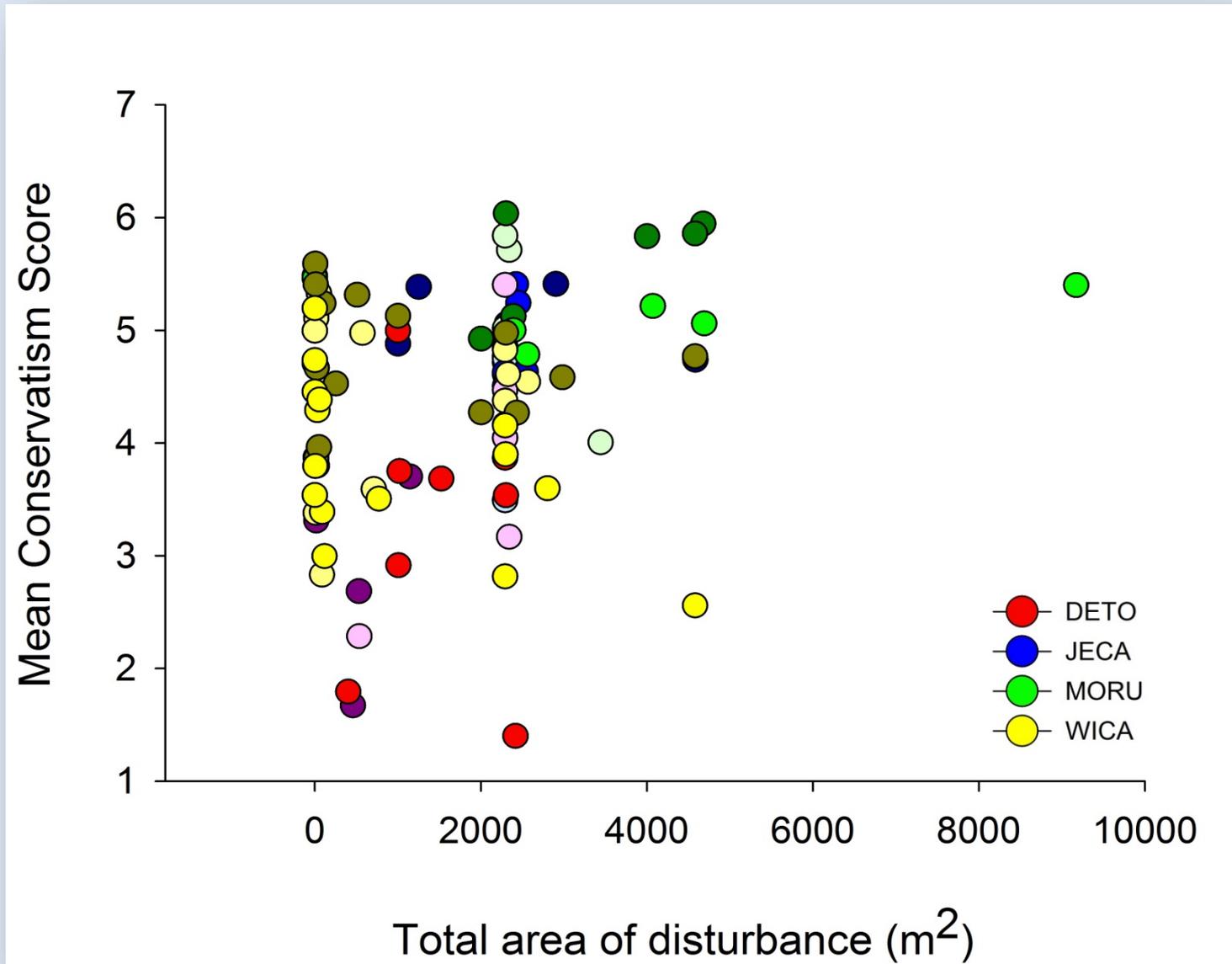
# Plant conservatism scores are highest at Mount Rushmore NMem



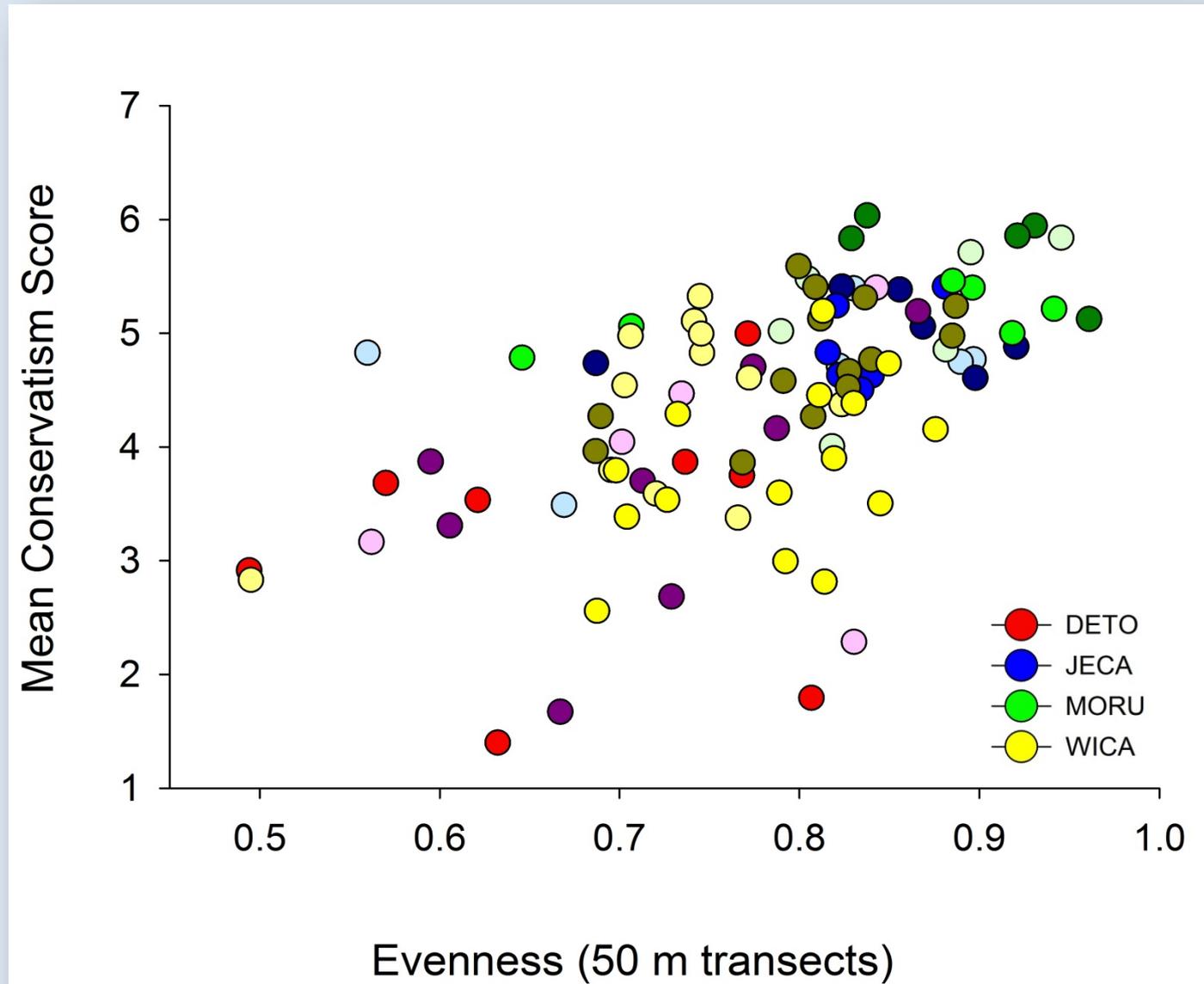
# C scores vary within and among parks



There is no relationship between mean C and measured site disturbance



# Evenness and mean C are positively correlated

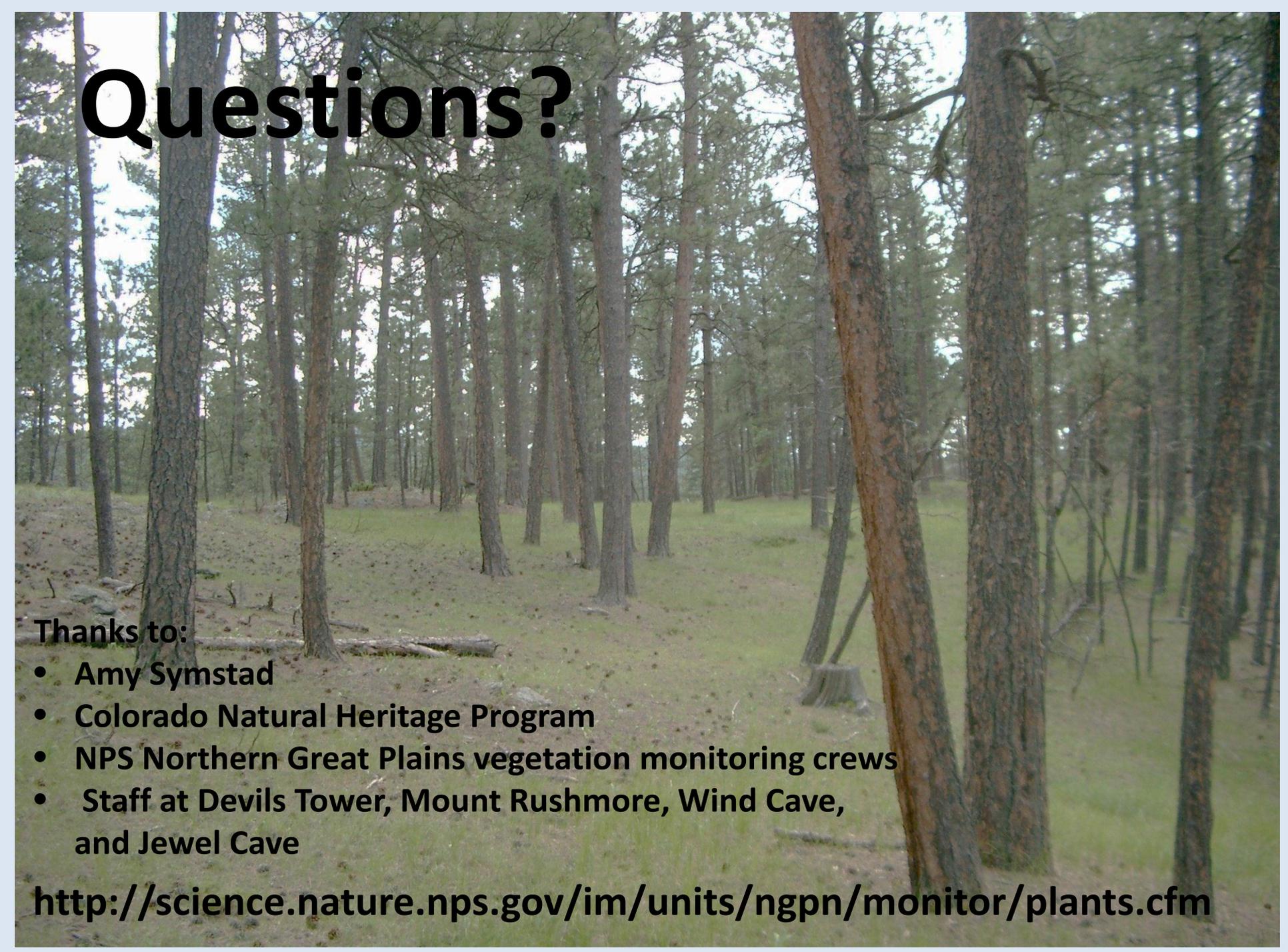


# Conclusions and Future Work

- Mean C score may be a useful tool for evaluating biological integrity
- We need a better understanding of the natural range of variability for plant community metrics (richness, evenness, diversity, mean C) within the Black Hills
- Work towards assigning conservatism scores for the Black Hills Flora
- Continue monitoring vegetation in National Park Units and managing to preserve ecological integrity



# Questions?

A photograph of a pine forest. The trees are tall and thin, with a dense canopy of green needles. The ground is covered in a mix of green grass and brown pine needles. The lighting is soft, suggesting an overcast day or a shaded area within the forest.

## Thanks to:

- Amy Symstad
- Colorado Natural Heritage Program
- NPS Northern Great Plains vegetation monitoring crews
- Staff at Devils Tower, Mount Rushmore, Wind Cave, and Jewel Cave

<http://science.nature.nps.gov/im/units/ngpn/monitor/plants.cfm>