Slender Rush-pea (*Hoffmannseggia tenella*): Conservation through Management—A Case Study

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Slender rush-pea

- Herbaceous perennial legume with a woody taproot (Fabaceae)
- Leaves are alternate
- Bipinnately compound with 5 to 7 leaflets
- Stem is often reddish
- Flowers are yellow-pink to orangish-red

J.M. Poole et al. 2007. Rare plants of Texas

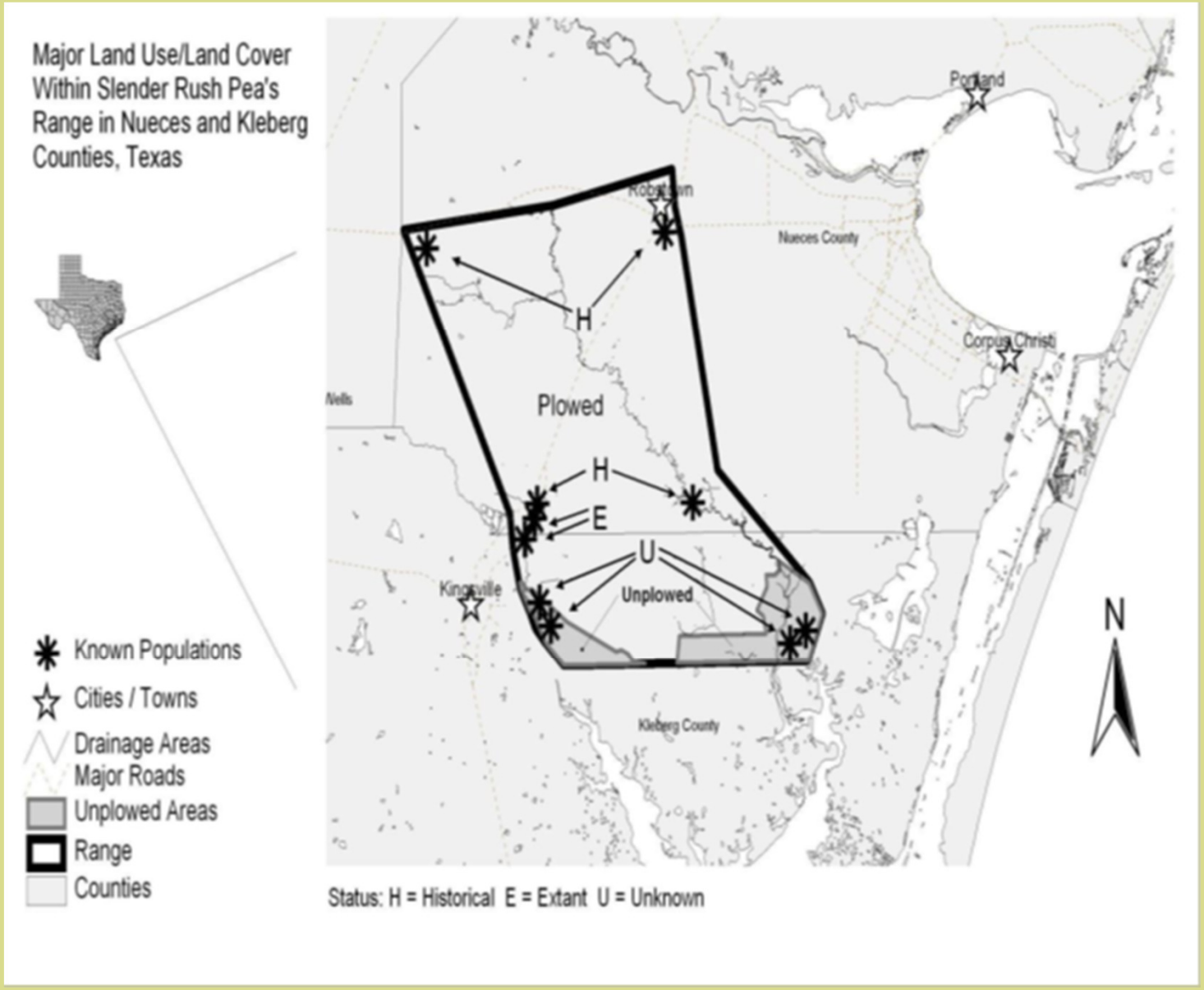
Background

- Remnant short-grass prairie sites
  - blackland clays
  - coarser texture and lighter colored than a clay
- Often found with South Texas ambrosia (*Ambrosia cheiranthifolia*)
- Endemic to Kleberg and Nueces counties

Current status

- Endangered (1985)—without critical habitat
- Destruction of native Gulf-coastal prairies
  - Agricultural expansion
  - Invasive grasses
    - Kleberg bluestem (*Dicanthium annulatum*)
    - Bermudagrass (*Cynodon dactylon*)

Known populations



Recovery Plan (1988)

- U.S. Fish and Wildlife Service
- “to develop and implement habitat management practices that will enhance the populations”
- No peer-reviewed literature on experimental studies

Study Area

- St. James Cemetery
- Bishop, TX (southern Nueces County)
- 8 ha (20 ac)
- Victoria Clay, 1 to 3 % slope
- Adjacent to Carreta Creek
- Jackie Poole (1985)
- Largest population known to exist
- Invaded by Kleberg bluestem and bufflegrass (*Cenchrus ciliaris*)

U.S. Fish & Wildlife Service.

Objectives

- Quantifying competitive effects between slender rush-pea and invasive grasses
- Assess the effects of prescribed burning on slender rush-pea individuals
  - Rx fire has low cost and mimics natural occurrence
  - Effects on slender rush-pea have not been studied at all
- Ecological neighborhood assessment

Methodology

- Treatments
  1. weed-eat neighboring plants
  2. herbicide neighboring plants
     - Neighboring plants within a 1-m diameter circle received a treatment
  3. prescribed burning
     - Small plots (roughly 10 m^2 minimum) including slender rush-pea plants
     - Wright and Bailey. 1982. Fire Ecology of United States and Southern Canada, p. 20

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  4. control (no manipulation)
- These treatments have been maintained since July 2012 and are repeated as necessary with precipitation

CONTROL

HERBICIDE

WEED EATER

BURN

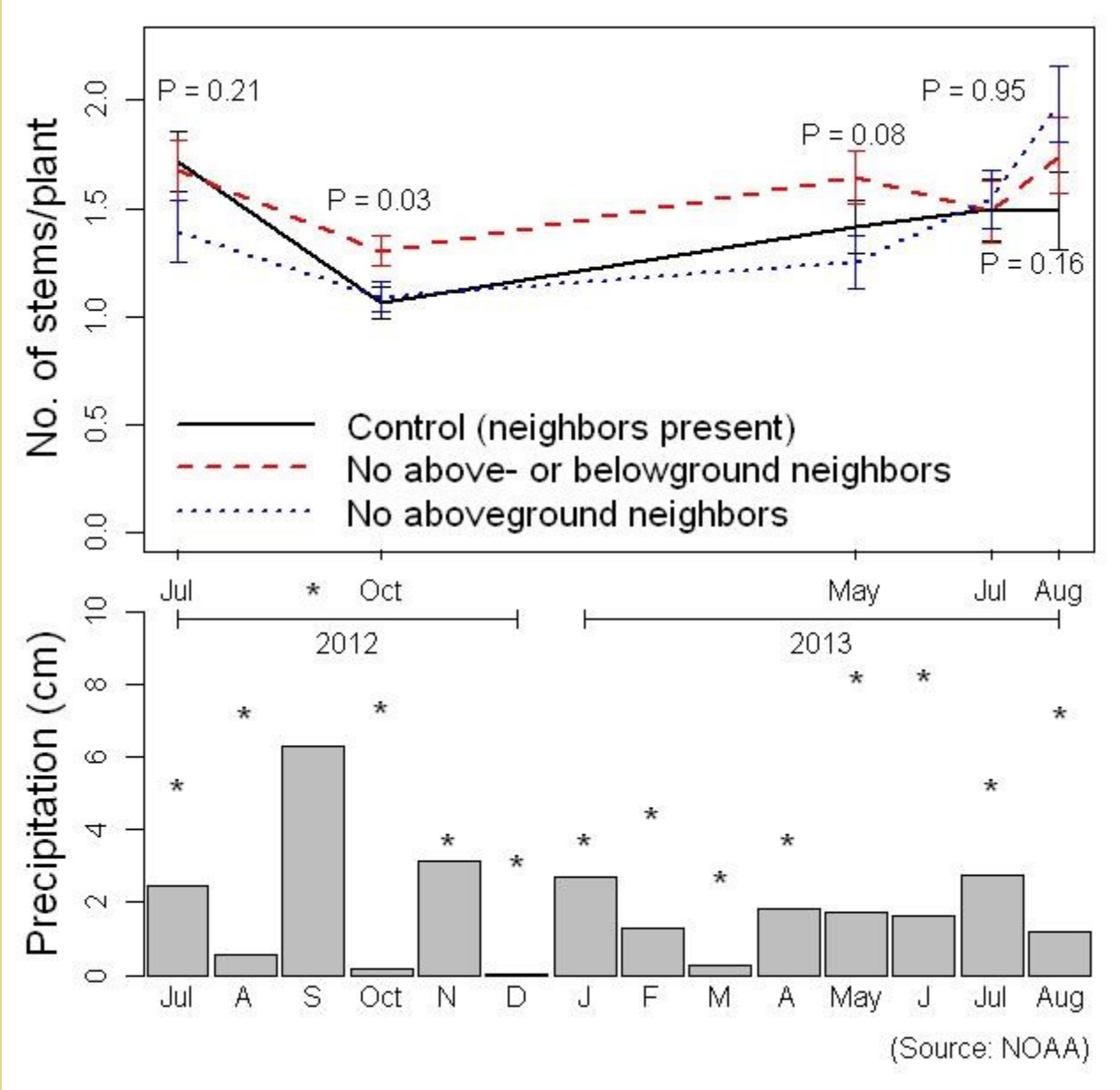
Response Variables

- Number of main stems
- Length of longest stem (mm)
- Number of leaves on longest stem
- Total number of flowers showing color on plant
- Total number of seed pods on plant
- Survival

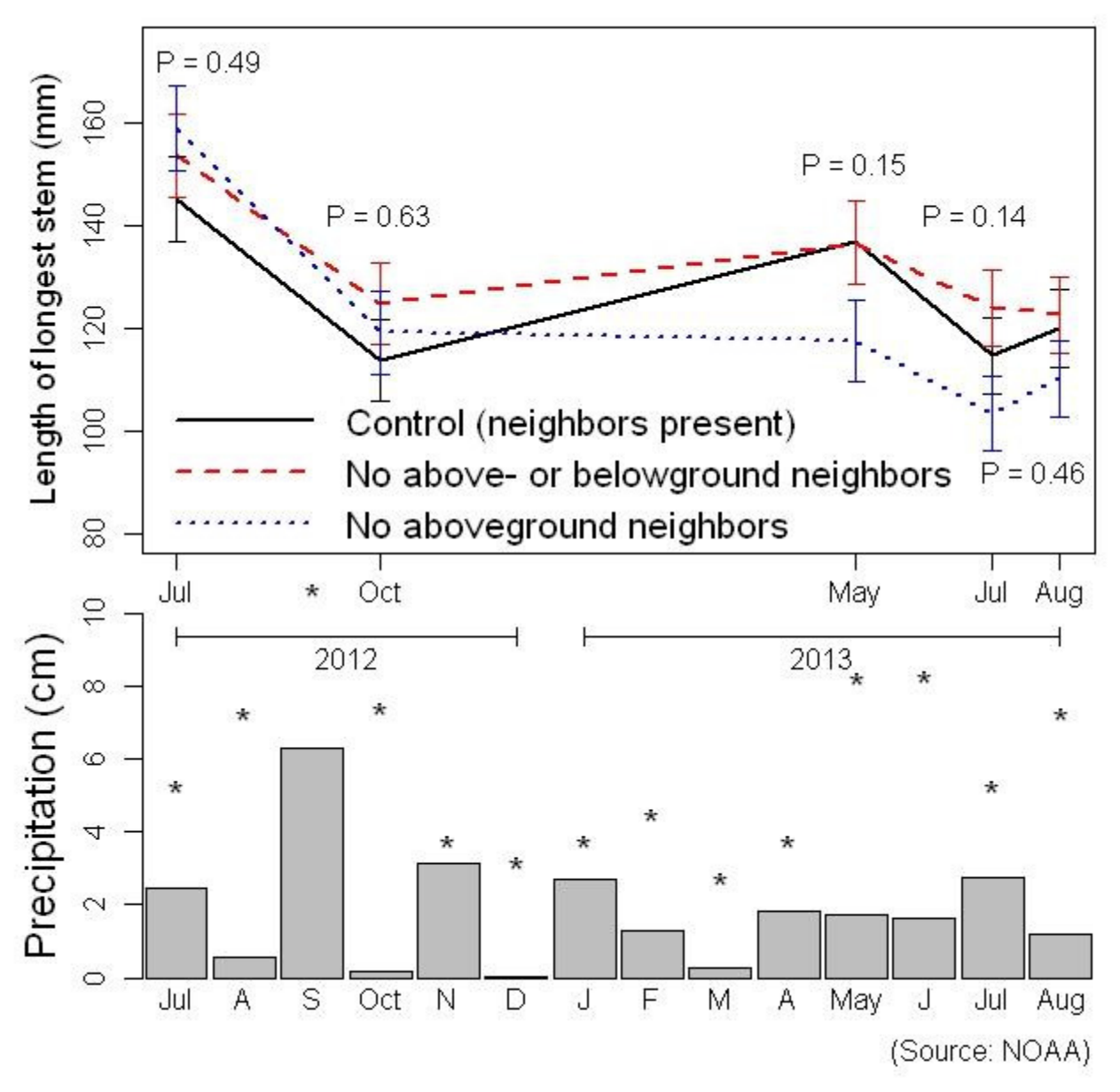
Statistical Analysis

- Count variables analyzed as a negative binomial distribution with a generalized linear mixed model for repeated measures
- Survival analyzed as a binomial distribution with a generalized linear mixed model for repeated measures
- Continuous variables analyzed with a general linear mixed model for repeated measures

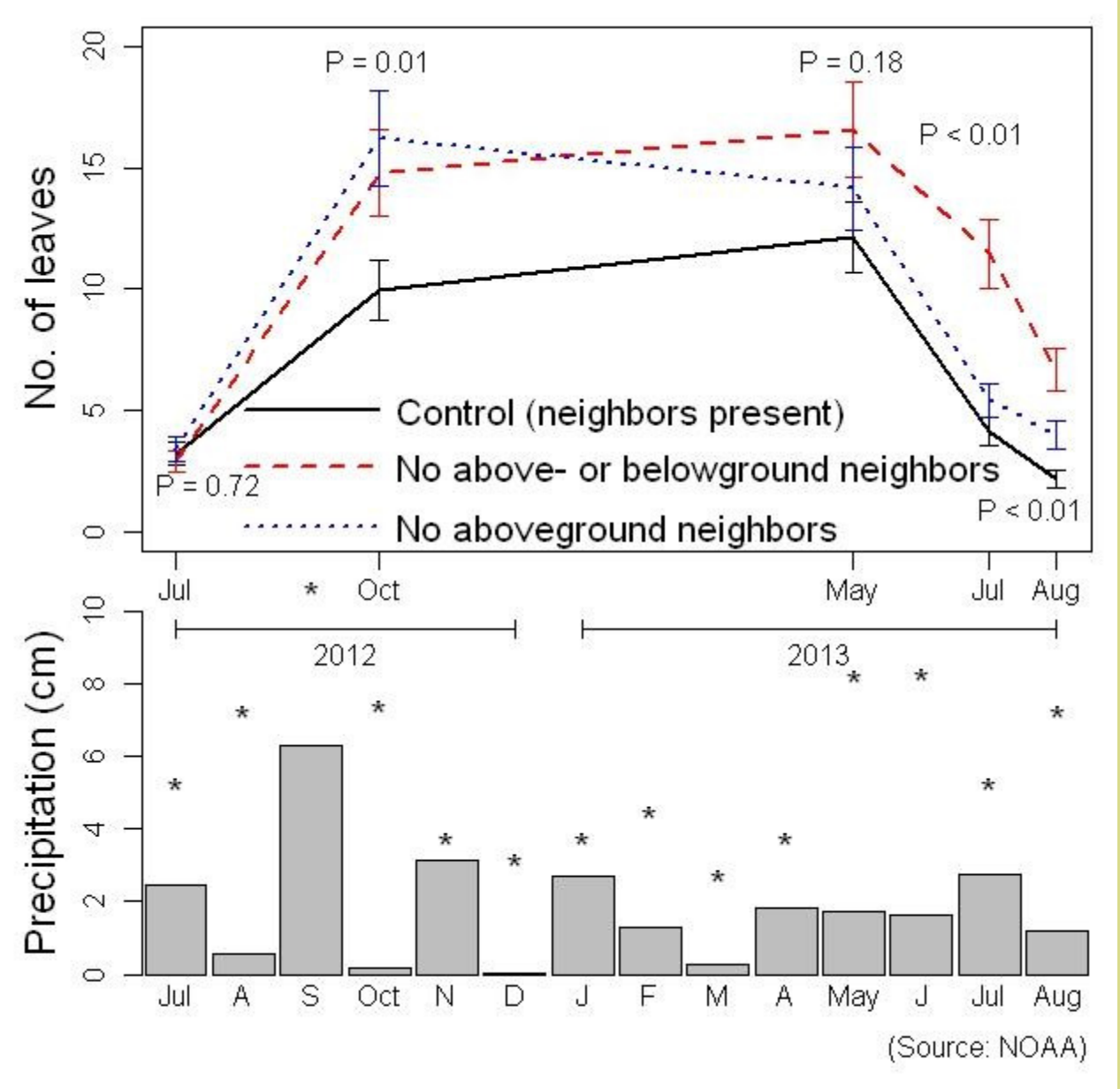
Number of Main Stems



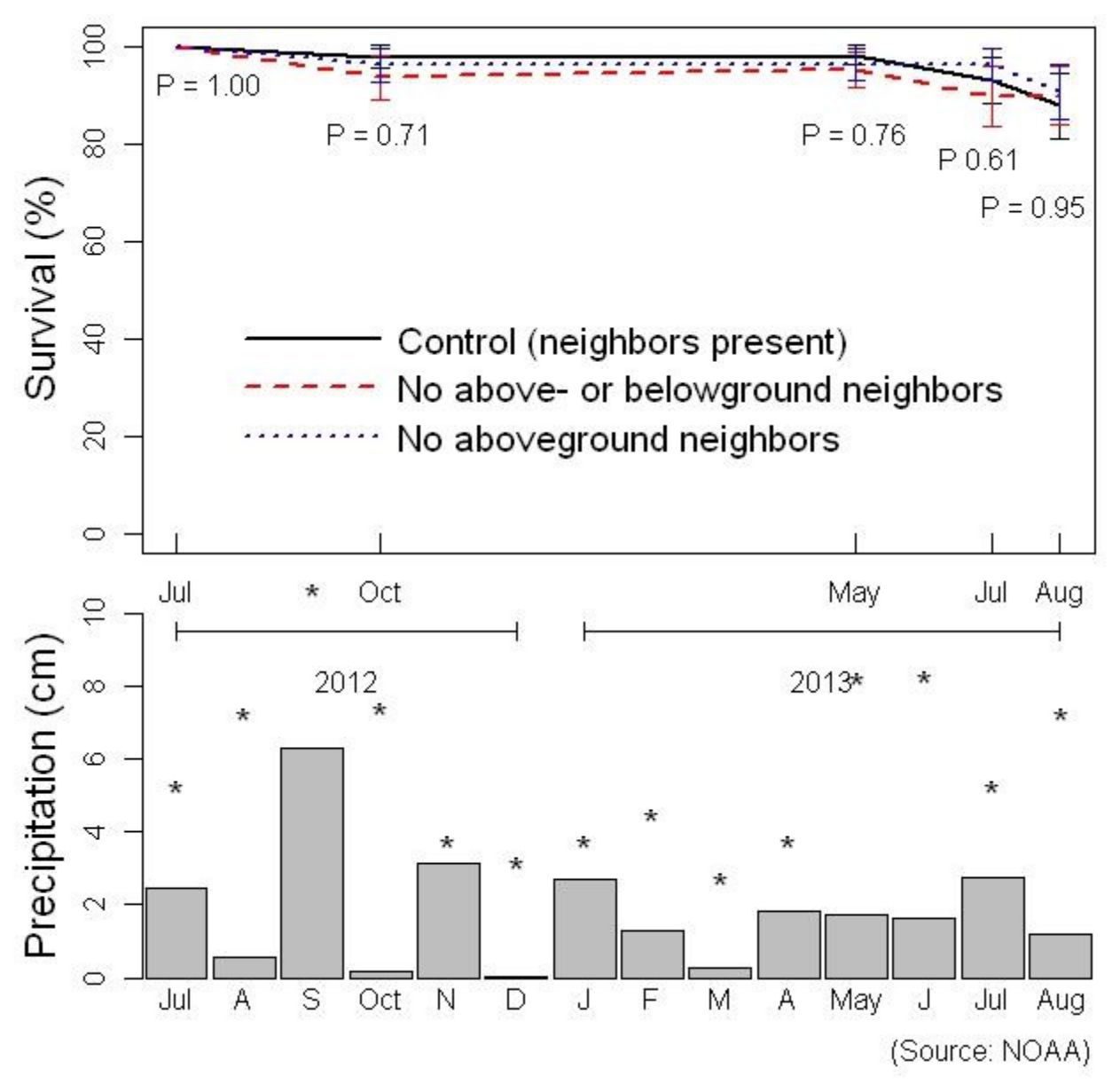
Length of Longest Stem (mm)



Number of Leaves on Longest Stem

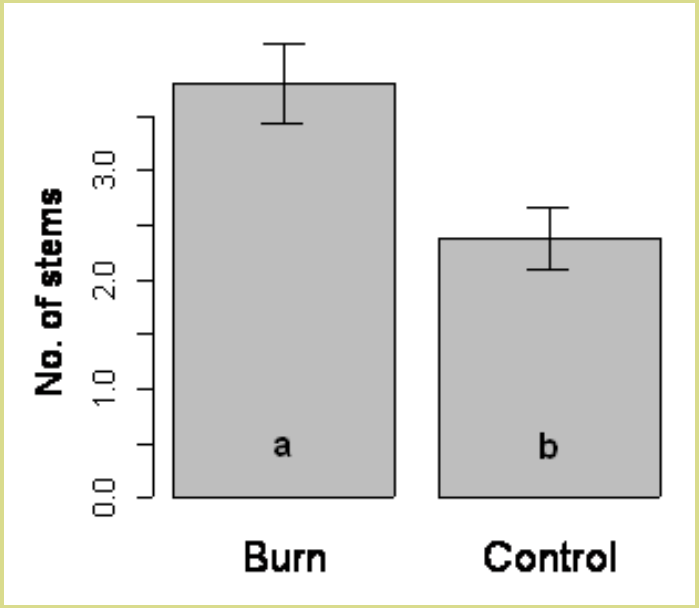


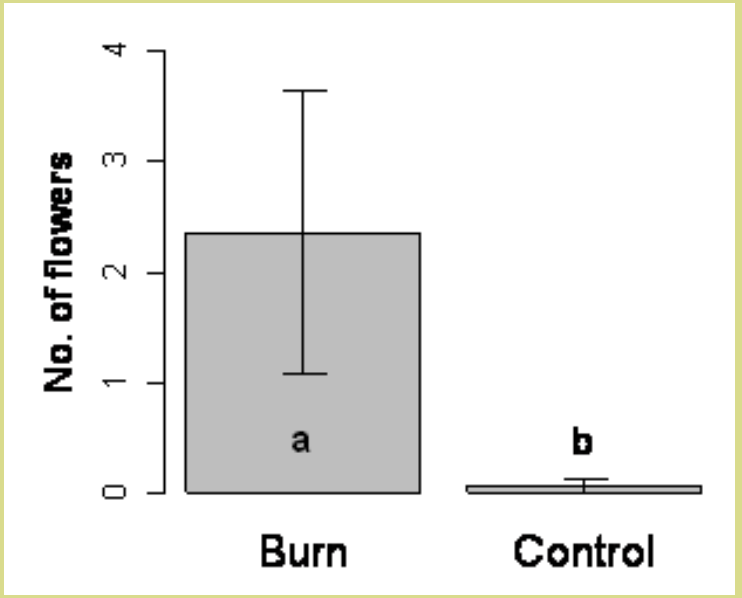
Survival (%)

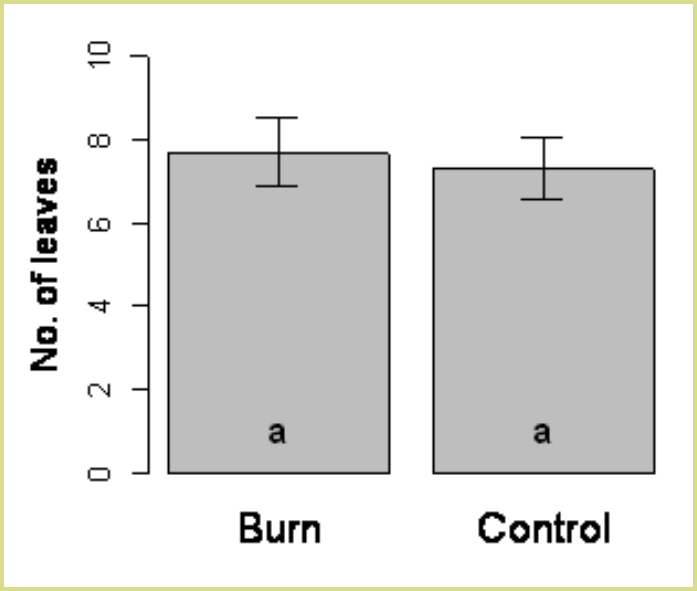

Survival (%)
100
80
60
40
20
0
P = 1.00
P = 0.71
P = 0.76
P 0.61
P = 0.95
Control (neighbors present)
No above- or belowground neighbors
No aboveground neighbors
Jul
Oct
May
Jul
Aug
Precipitation (cm)
10
8
6
4
2
0
2012
2013
Jul
A
S
Oct
N
D
J
F
M
A
May
J
Jul
Aug
(Source: NOAA)

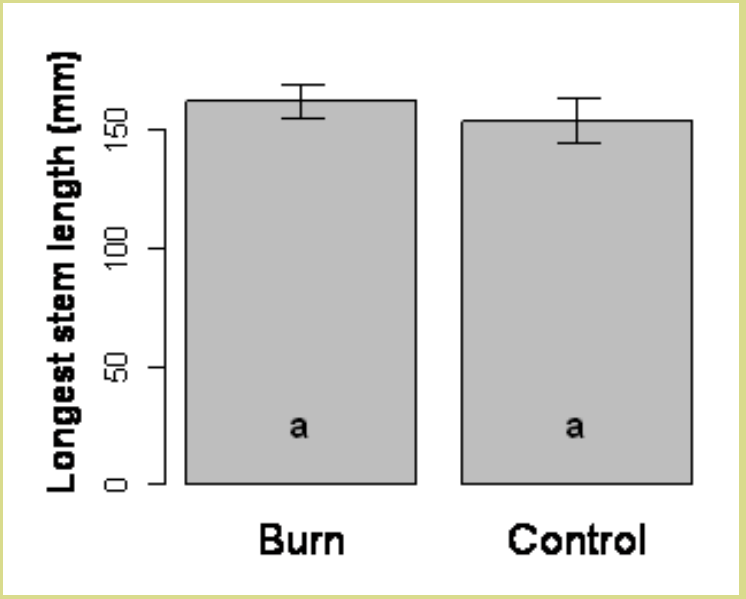
Fire Effects

- Burning took place Aug. 6, 2013
- Data for post-fire comparisons were collected in Sep. 23.









Preliminary Conclusions

Morphometric Responses

- Ability to adapt to enhanced resource availability by:
  - growing more leaves
  - growing more stems
- Treatments could result in different responses under different environmental conditions

Management Implications

- Removal or reduction of competition seems to serve as an effective management strategy
- Results are preliminary

Management Implications

Our goal is to create effective management recommendations for survival and encouragement of slender rush-pea populations

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Thank You

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Questions?