

Effects of Fuel Management Treatments in the Spring Mountains National Recreation Area

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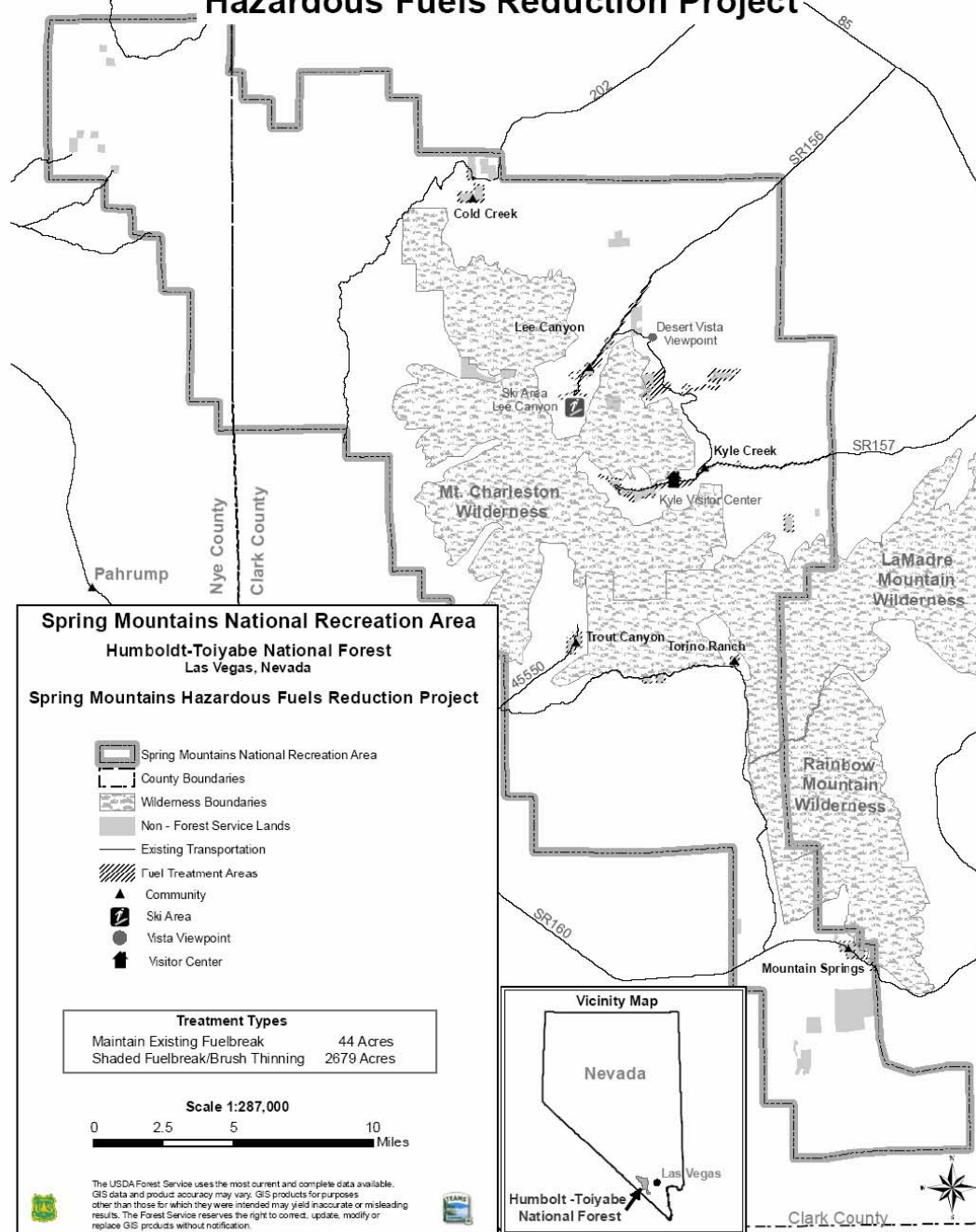
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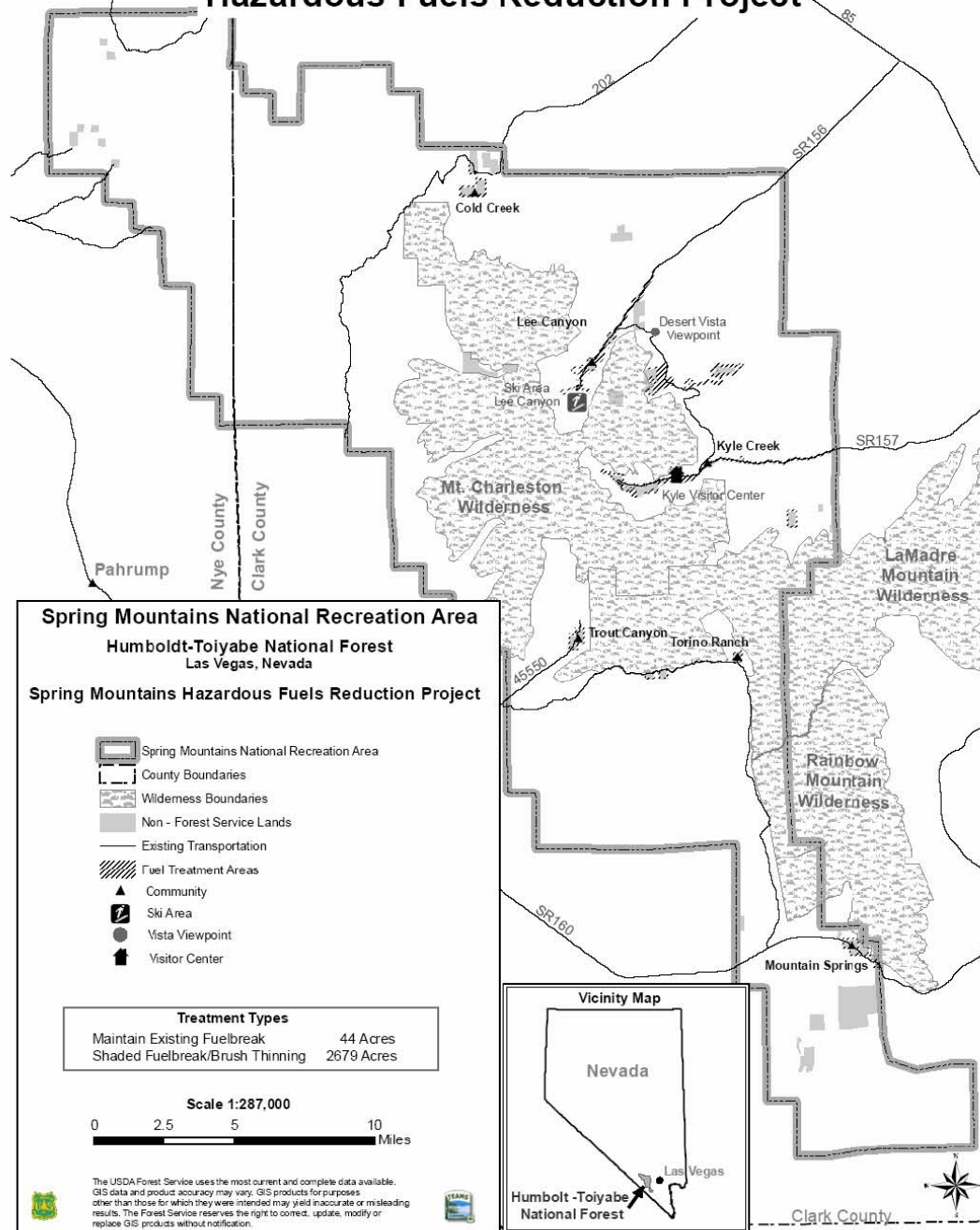
Spring Mountains Hazardous Fuels Reduction Project



Background & Purpose and Need

- The Nevada Community Wildfire Risk/Hazard Assessment **identified communities at risk to wildfire in and around the Spring Mountains National Recreation Area (SMNRA).**
- **Established escape routes** for residents of these communities and forest users are compromised due to nearby vegetative conditions that may result in fire behavior that **does not allow for safe fire suppression or evacuation.**
- To **reduce this risk**, there is a need to **interrupt continuous stands of fuels** on National Forest System lands in the wildland-urban interface (WUI) **to create defensible space** from fires around communities, protection of existing infrastructure, and effective established escape routes.
- The **Spring Mountains Hazardous Fuel Reduction Project will reduce the wildfire risk to life and property** in the SMNRA WUI.

Spring Mountains Hazardous Fuels Reduction Project



Project Basis

The emphasis of this project is to establish a well-replicated set of baseline vegetation plots that can be sampled in the future with additional funding to determine post-thinning effects.

Hypotheses

This baseline, pre-thinning treatment data will be used in conjunction with future data collection to assess the following hypotheses:

1. Mechanical fuel treatments in target plant community types will significantly:
 - ▼ Decrease stem density and cover of trees and shrubs
 - ▲ Increase density, cover, and diversity of non-native invasive plants
 - ▲ Increase density, cover, and diversity of native annual plants
 - ▲ Increase stem density, cover, and diversity of native perennial grasses
2. Δ density and cover target MSHCP covered plant species.
3. Δ the abundance and diversity of butterfly LHP and NHP's.

Project Goals

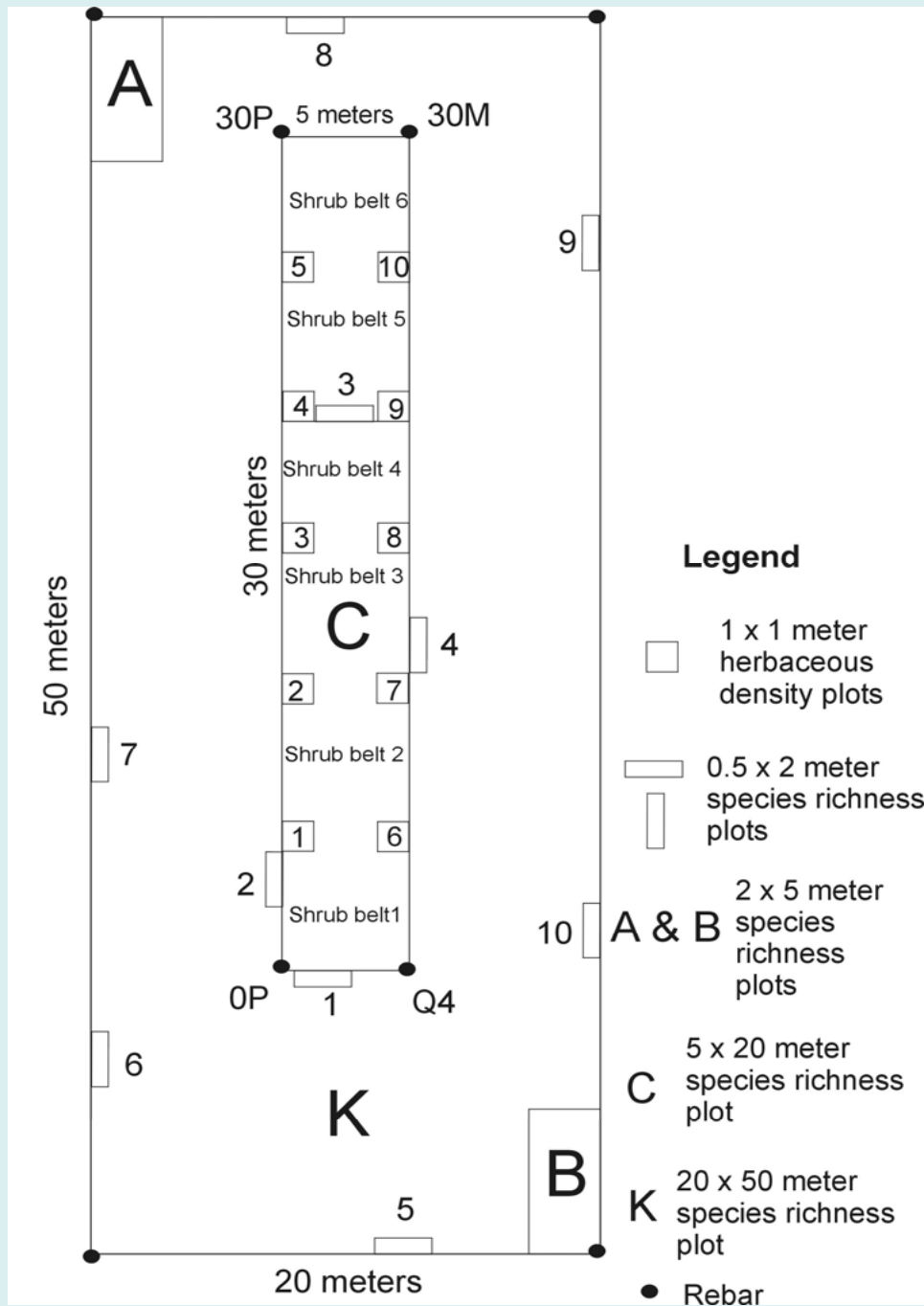
Goals for this project are as follows:

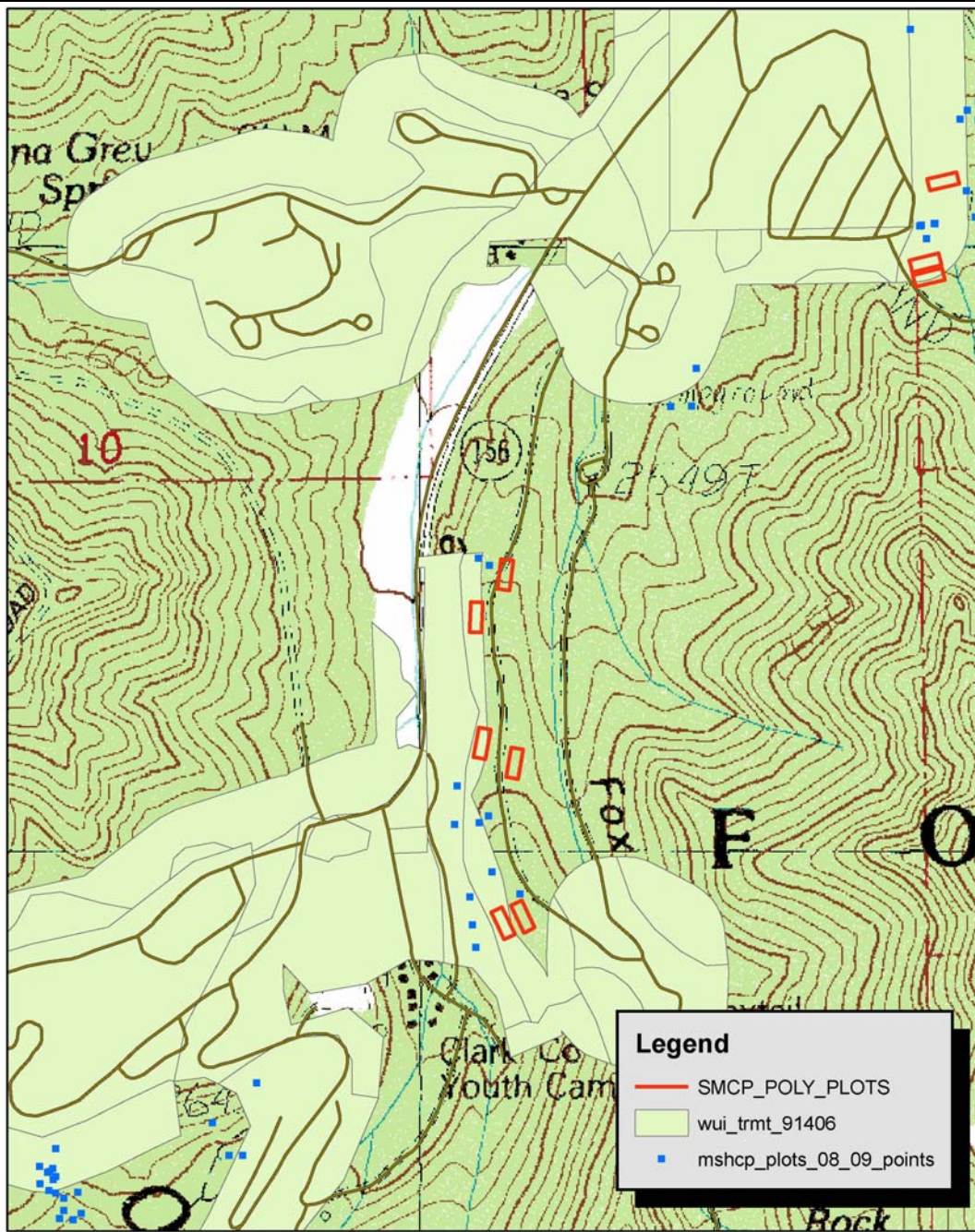
1. Establish vegetation monitoring plots in both treated and untreated (control) areas. These plots will be used to measure population data for covered species, population data for the LHP/NHP of covered butterflies, species diversity data for the plant community, and perennial plants in particular, and data on non-native plant presence and abundance.
2. Collect and analyze pre-treatment vegetation data.
3. Produce a report describing baseline vegetation conditions.

Sampling Framework

1. Community (biodiversity)
2. Population

Community level sampling





Community - Biodiversity Sampling

Community Type	WUI Treatment	Control
Pinyon – Juniper	11	11
Mixed-conifer Forest (Ponderosa)	9	9
Artemisia - mixed shrubland	12	12
Plot Totals	32	32

Community Preliminary Results- Sagebrush Plots Diversity

Index	Control	Treatment
Simpsons D	9.12	11.01
Shannon-Wiener	2.308	2.479
McIntosh E	0.729	0.762

All Indices – non significant

Community Preliminary Results

Mixed Conifer Plot Diversity

Index	Control	Treatment
Simpsons D*	6.21	8.27
Shannon-Wiener	2.25	2.34
McIntosh E*	0.77	0.84

Treatment plots tend to be more diverse/even

Community Preliminary Results – Pinyon/Juniper Plot Diversity

Index	Control	Treatment
Simpsons D	14.41	14.62
Shannon-Wiener	3.02	2.94
McIntosh E	0.88	0.91

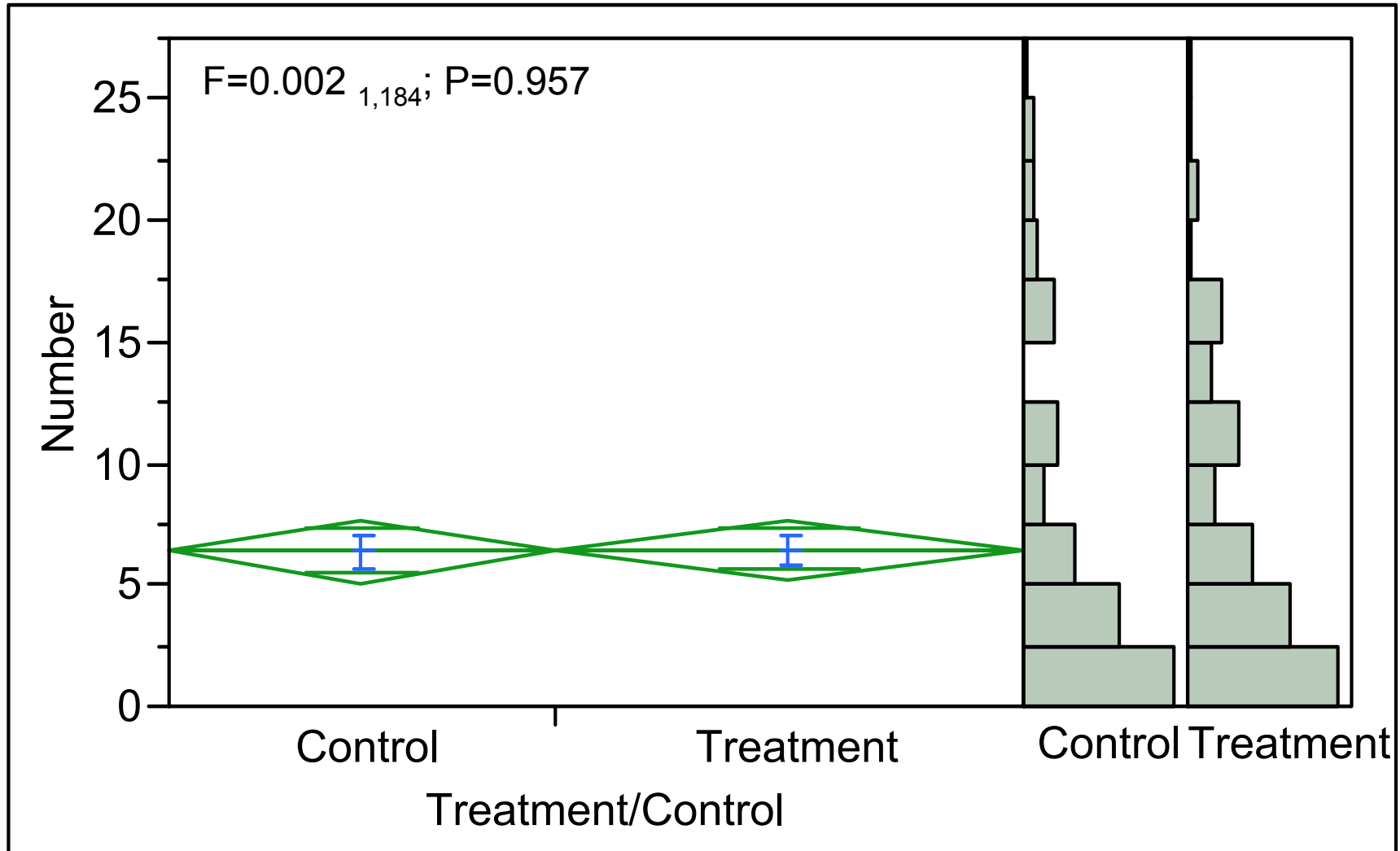
All Indices – non significant

Community Preliminary Results Ponderosa

Index	Control	Treatment
Simpsons D	8.94	7.93
Shannon-Wiener	2.29	2.15
McIntosh E	0.91	0.91

All Indices – non significant

Wyoming Big Sagebrush Shrub Cover



MSHCP – Covered Species



King's rosy sandwort
(*Arenaria kingii* ssp. *rosea*)



Clokey eggvetch
(*Astragalus oophorus*)



Charleston grounddaisy
(*Townsendia jonesii* var. *tulmulosa*)



rough angelica
(*Angelica scabrida*)



Clokey milkvetch
(*Astragalus aequalis*)



**Spring Mountains *acastus* checkerspot
(*Cholsyne acastus robusta*)
larval/nectar host plants**

desert ceanothus
(*Ceanothus greggi*)



Clokey fleabane
(*Erigeron clokeyi*)

Palmer's penstemon
(*Penstemon palmeri*)



narrowleaf yerba santa
(*Eriodictyon angustifolium*)

Nevada goldeneye
(*Heliomeris multiflora*)



rubber rabbitbrush
(*Ericameria nauseosa*)

lobeleaf groundsel
(*Packera multilobata*)



spreading dogbane
(*Apocynum androsaemifolium*)

Mt Charleston Blue (*Icaricia shasta charlestonensis*)

Larval/nectar host plants



Torrey's milkvetch
(*Astragalus calycosus*)



heath aster/rose heath
(*Chaetopappa ericoides*)



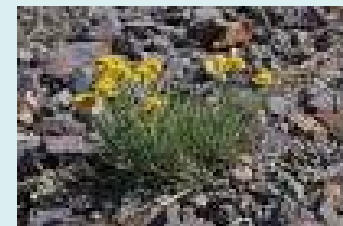
Pinyon aster
(*Machaeranthera canescens*)



Clokey fleabane
(*Erigeron clokeyi*)



Lemmon's rubberweed
(*Hymenoxis lemmonii*)



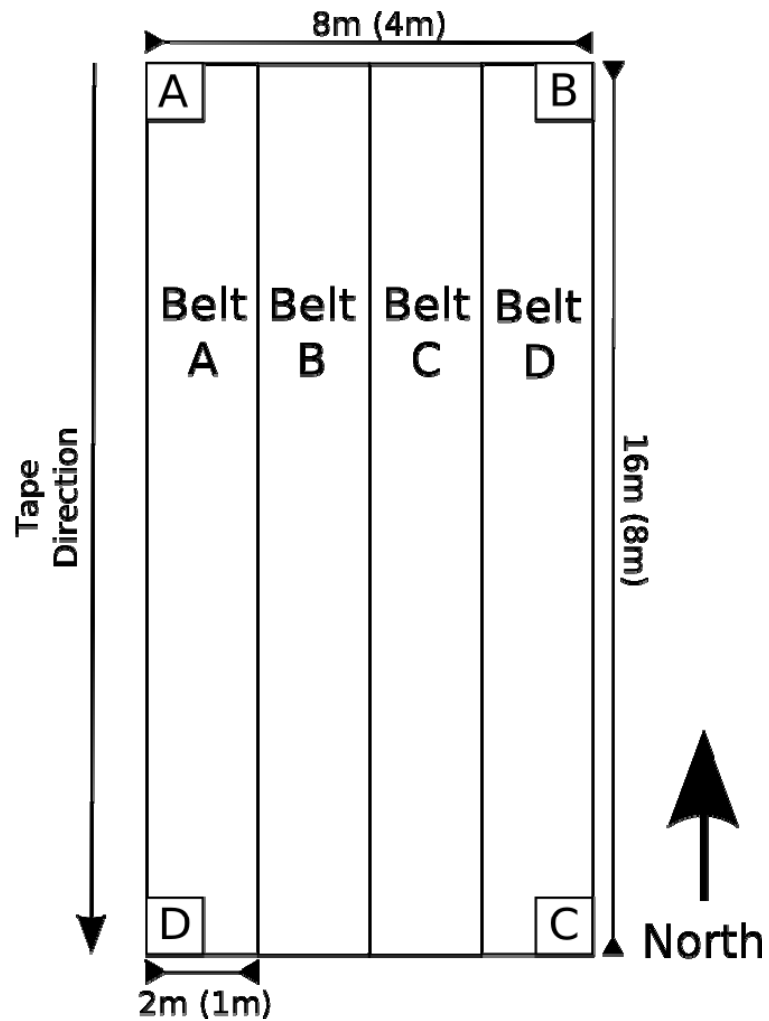
Dark blue butterfly
(*Euphilotes ancilla purpura*)
Larval/nectar host plants

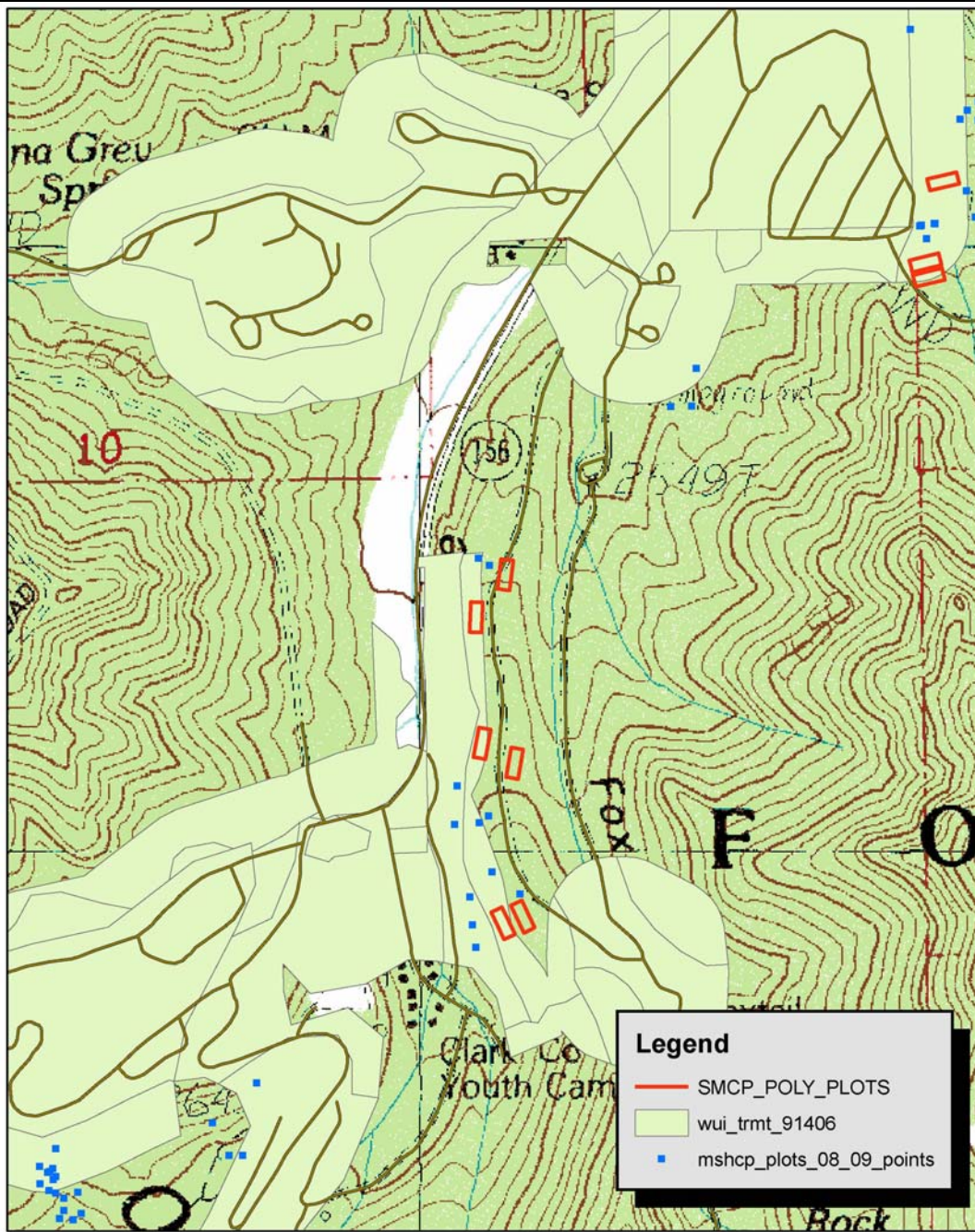


sulphur-flower buckwheat
(*Eriogonum umbellatum*)



Population Sampling





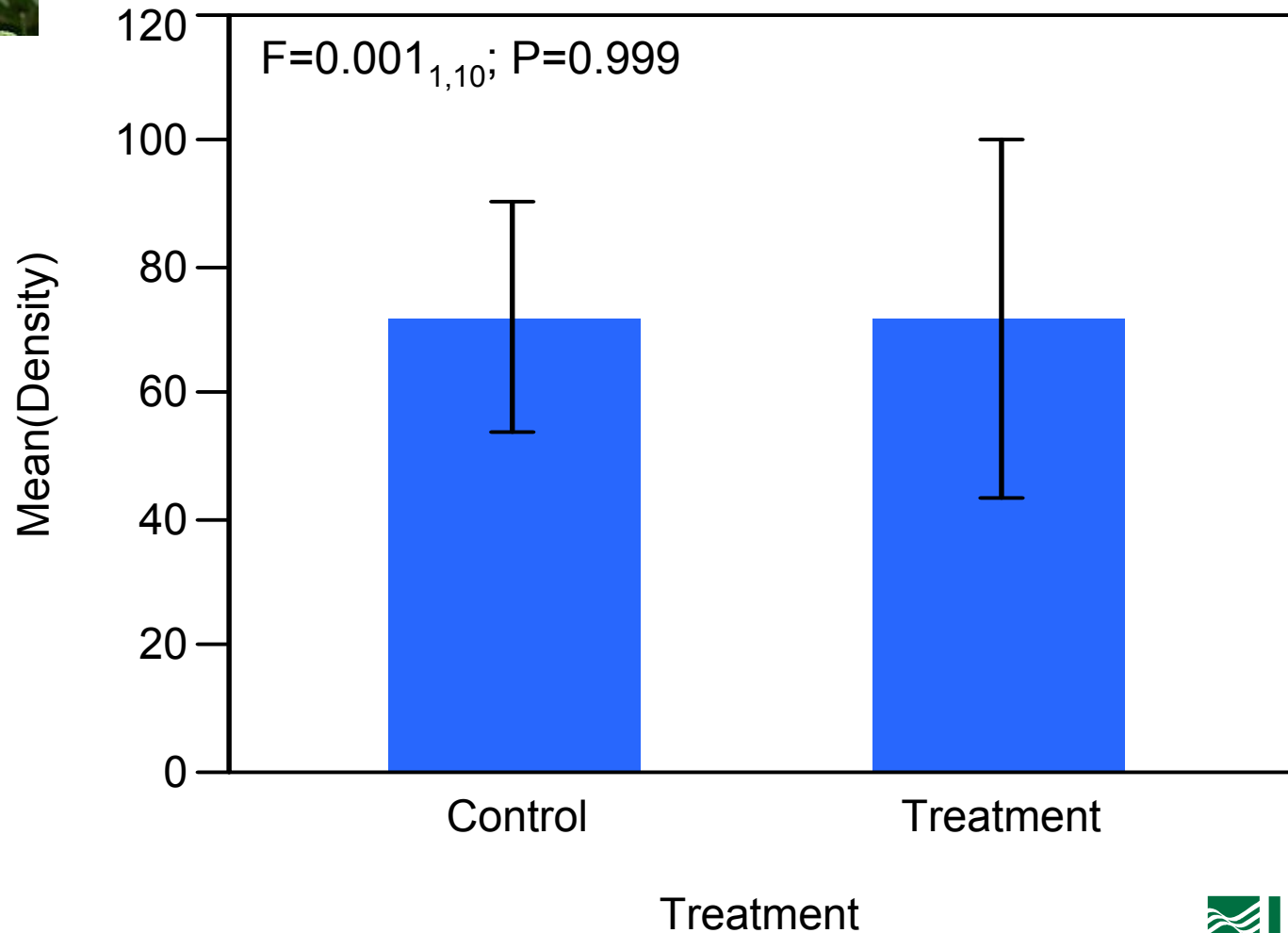
Population Level Sampling Metrics

- Number
- Size (lvs, height, stems, etc.)
- Inflorescences (height, number)
- Flower (number)
- Substrate
- Physical setting
- Associated species present





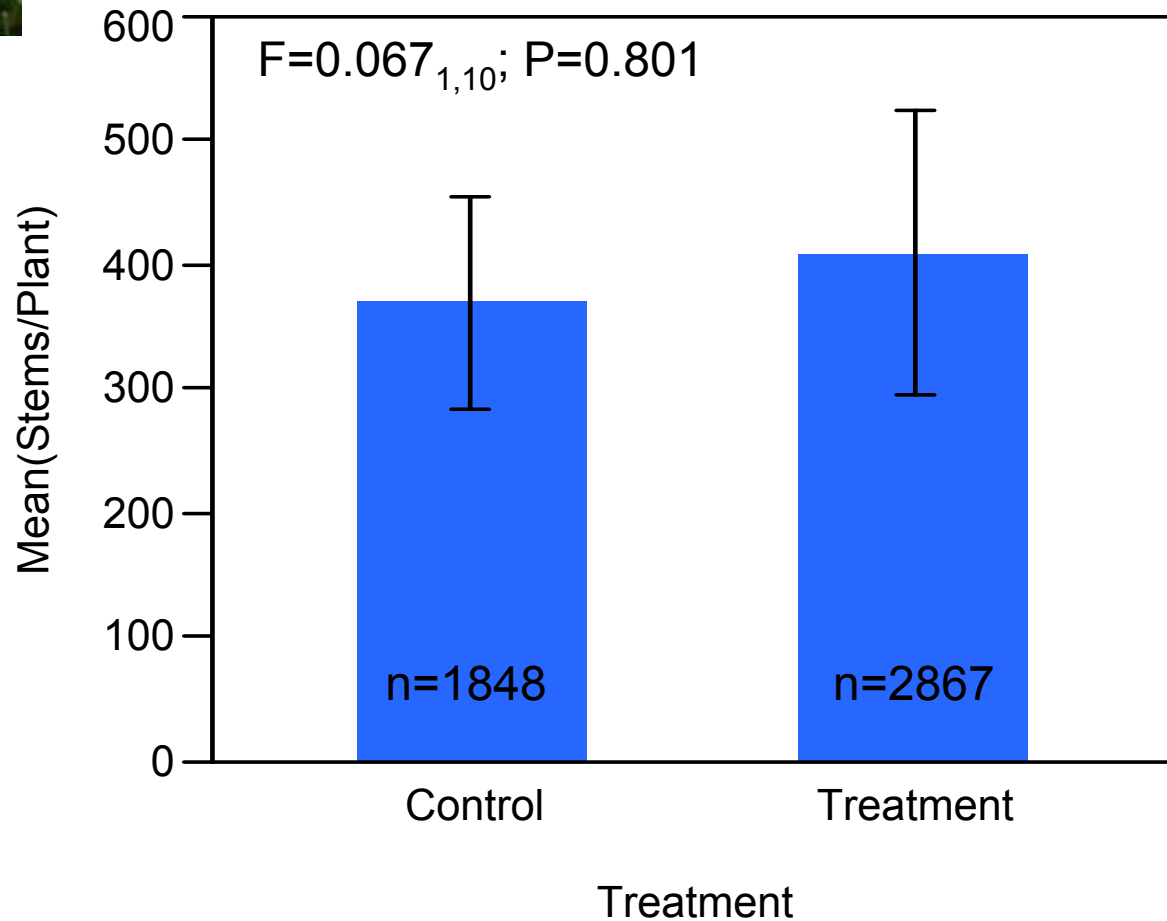
Rough angelica (*Angelica scabrida*)- Plant Density



862 plants (360 Control, 502 treatment)

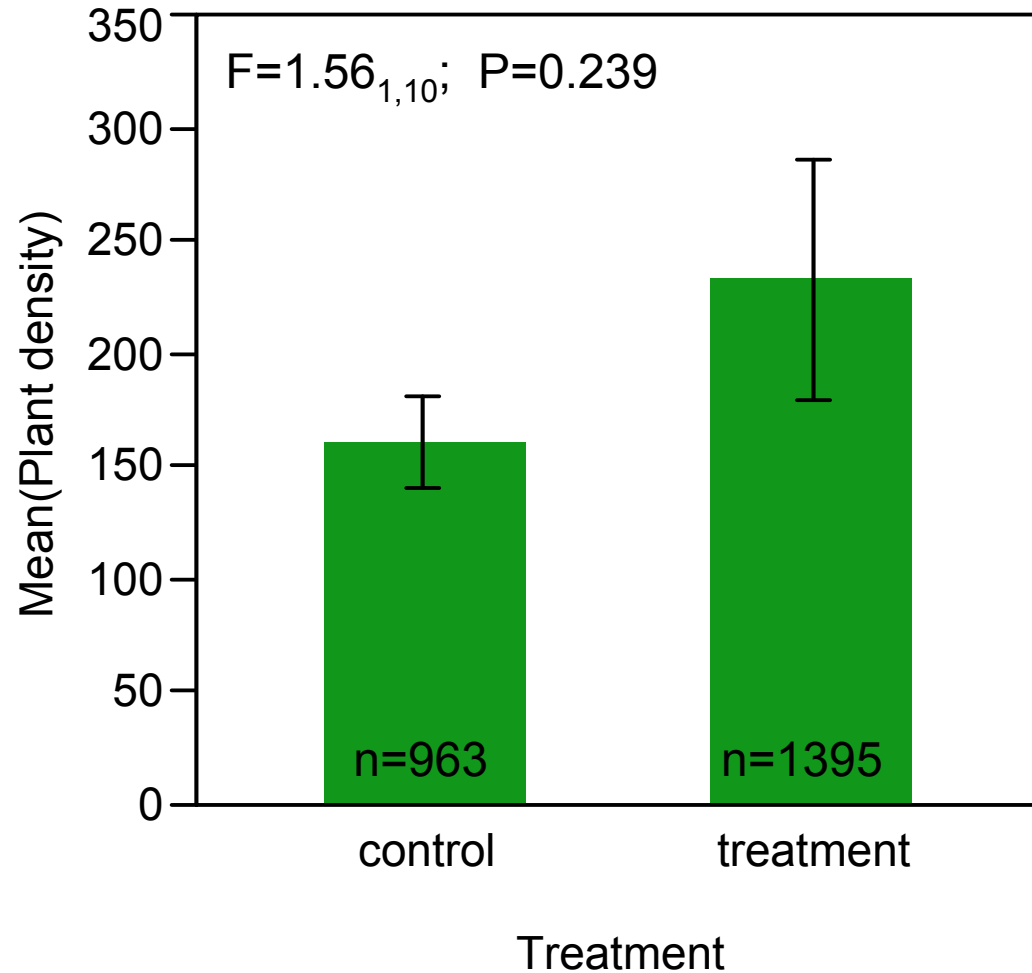


Rough angelica (*Angelica scabrida*)- Stems/Plant





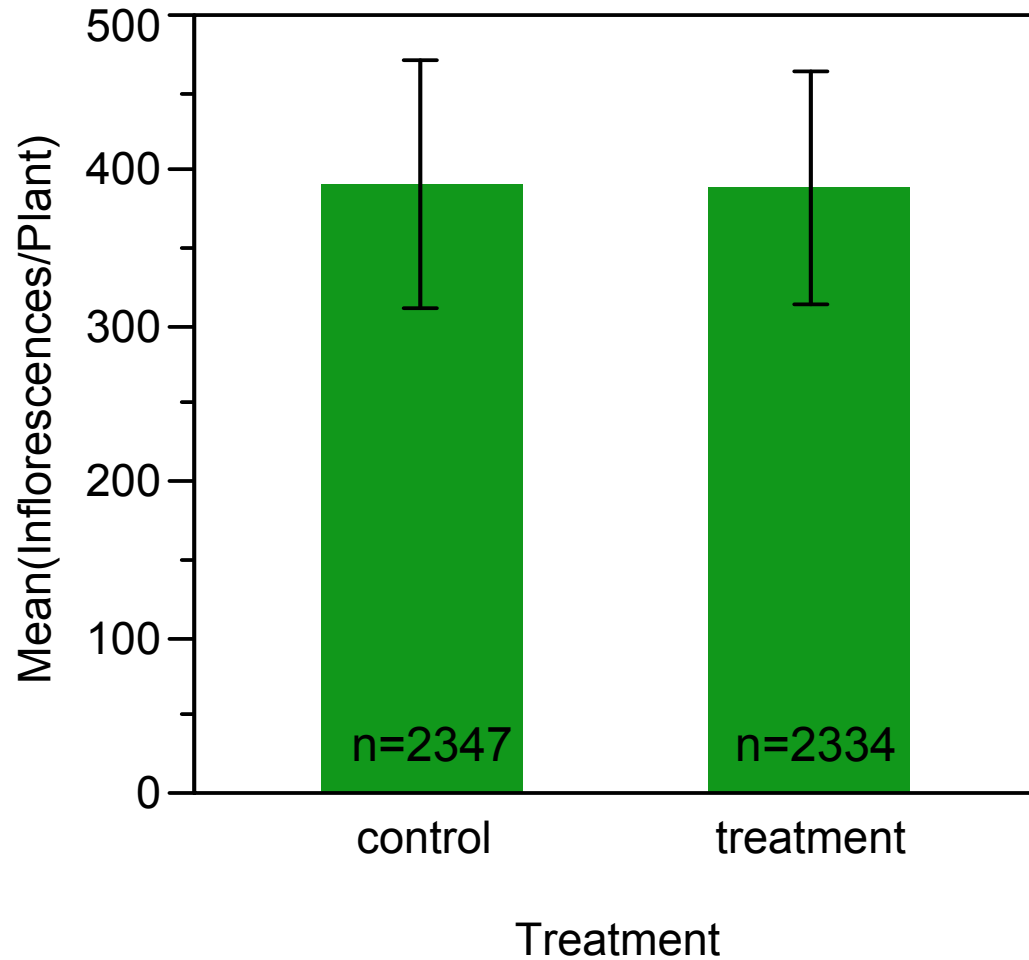
King's rosy sandwort (*Arenaria kingii* ssp. *rosea*) Plant density





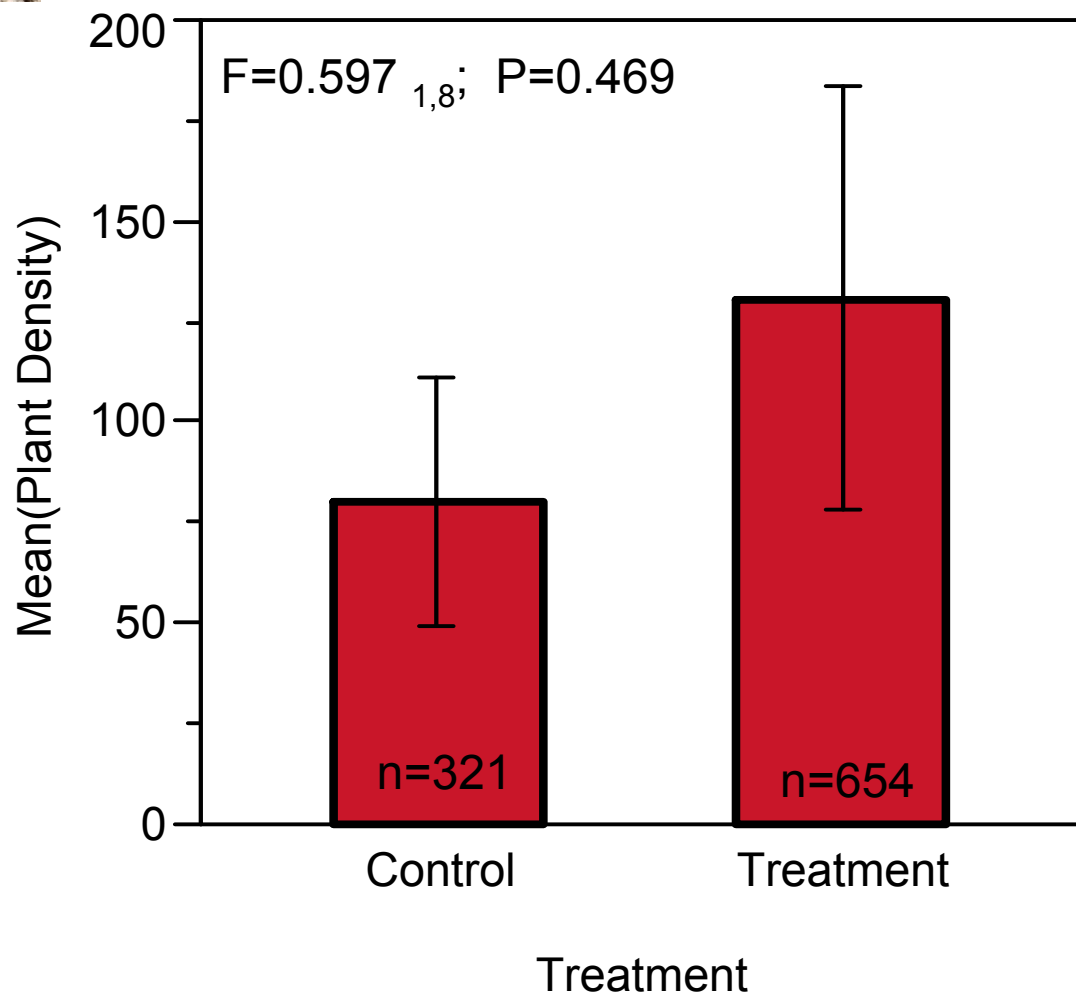
King's rosy sandwort (*Arenaria kingii* ssp. *rosea*) inflorescences

$F=1.56_{1,10}$; $P=0.239$



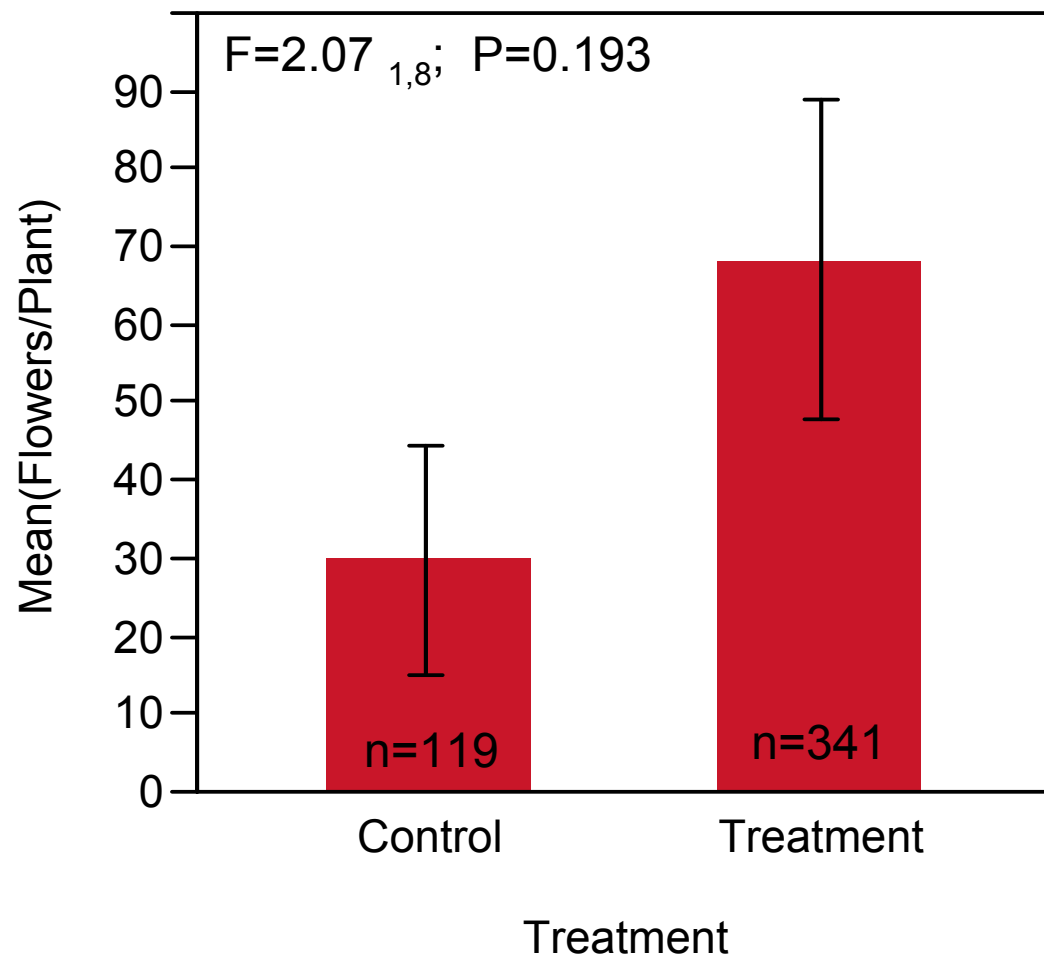


Charleston grounddaisy (*Townsendia jonesii* var. *tulmulosa*) Plant Density





Charleston grounddaisy (*Townsendia jonesii* var. *tulmulosa*) Flowers/Plant



Future Research Opportunities

- Conduct analyses/develop models to predict suitable habitat for covered species,
- Acquire resources for follow-up, post thinning treatment sampling.

Acknowledgments

- DCP – Clark County NV.
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- US Fish and Wildlife Service
- USGS Biological Science Technicians
- Student Conservation Association