Effects of Vegetation Management on Stephens' Kangaroo Rat Translocation Success and Native Plant Establishment

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Problems withTranslocations

Dispersal

Predation

Site fidelity

Conspecific familiarity

Site familiarity

Problems with Translocations

Dispersal

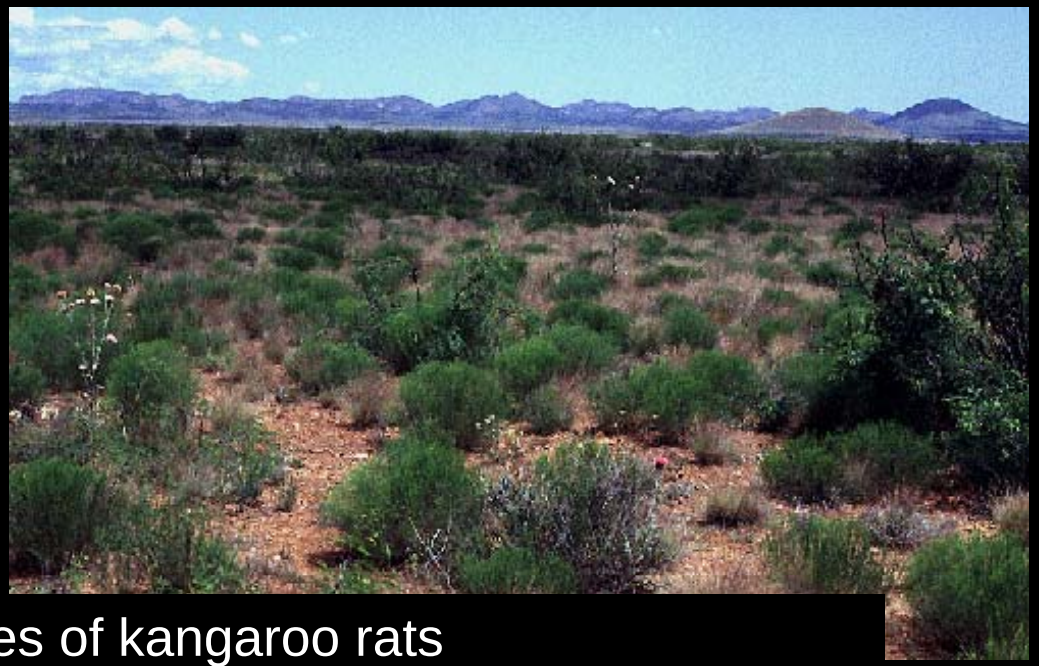
Predation


DANGER
ELECTRIC
FENCE


Stephens' kangaroo rat
(Dipodomys stephensi)

- Nocturnal
- Solitary
- Territorial
- Philopatric
- Prefer forb dominated open grasslands

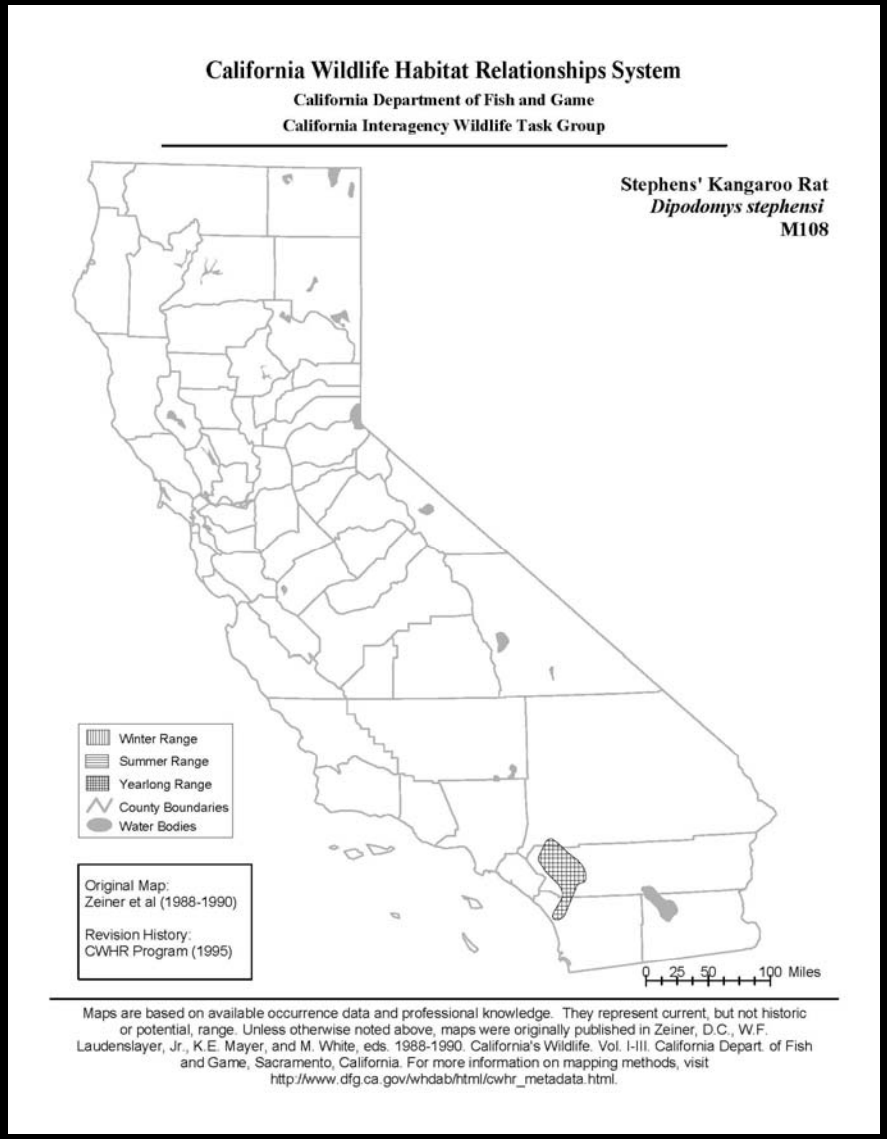
Chihuahuan Desert Scrub



Removed 3 species of kangaroo rats
Decreased soil disturbance (foraging and burrowing)

Brown & Heske (1990) Science

Distribution Map




Southwestern Riverside County Multispecies Reserve
Temecula, California, USA

Procedure

Site establishment

Mark, observe, recapture

Holding

Soft release

Telemetry & Census

Vegetation Management for SKR Translocation

Mowing

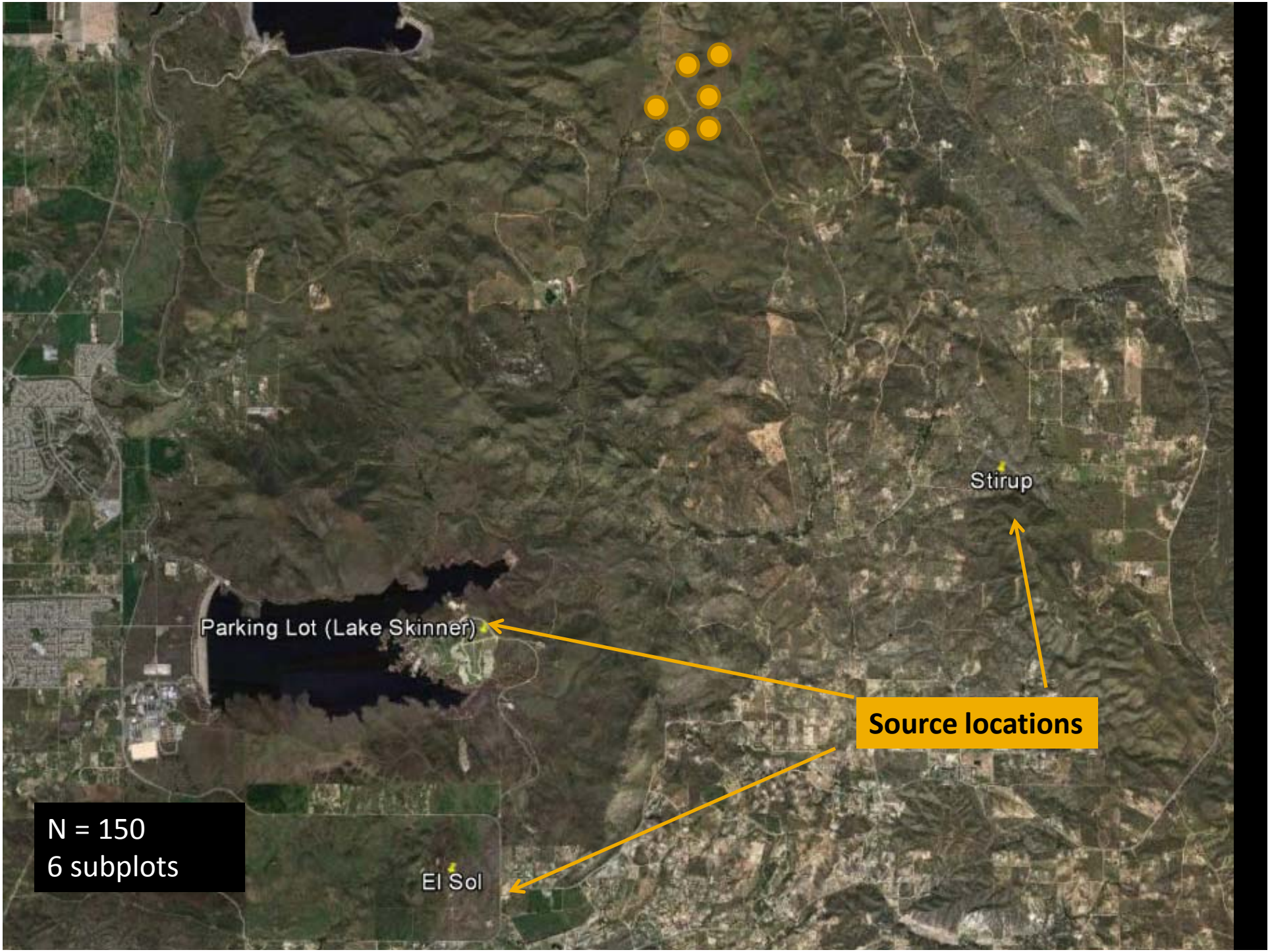
Time intensive to prep and maintain
SKR fair well but may prefer more open ground

Burning

Logistically challenging
Restricts translocation timing but long lasting

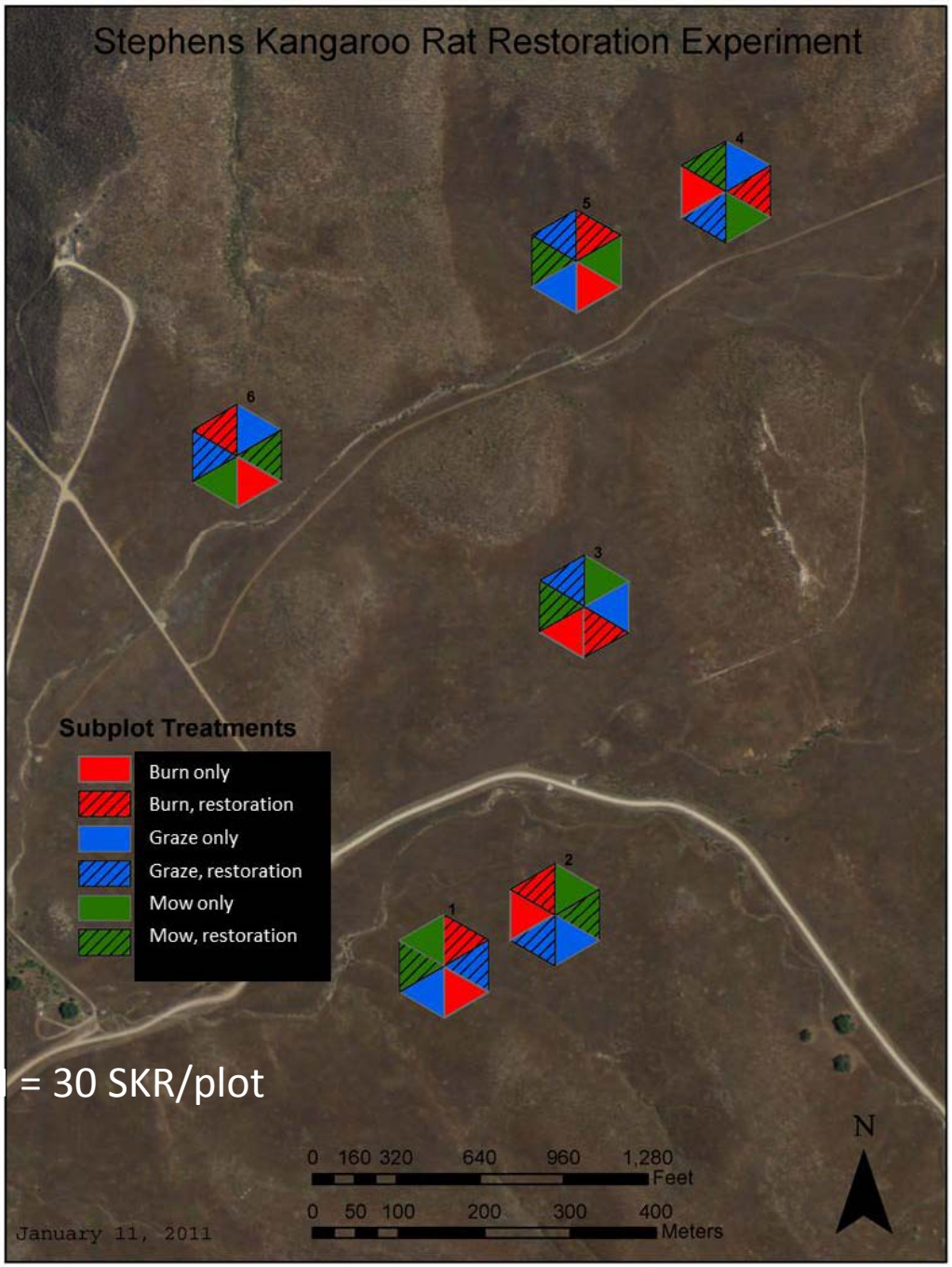
Grazing

Favors nonnatives, increases Nitrogen in soil
Changes the nutrient composition of grasses
Short term strategy


Stirup
Parking Lot (Lake Skinner)
Source locations
N = 150
6 subplots
El Sol

Plot Size = 0.94 ha

Subplot= 1,560m^2



May-June 2010

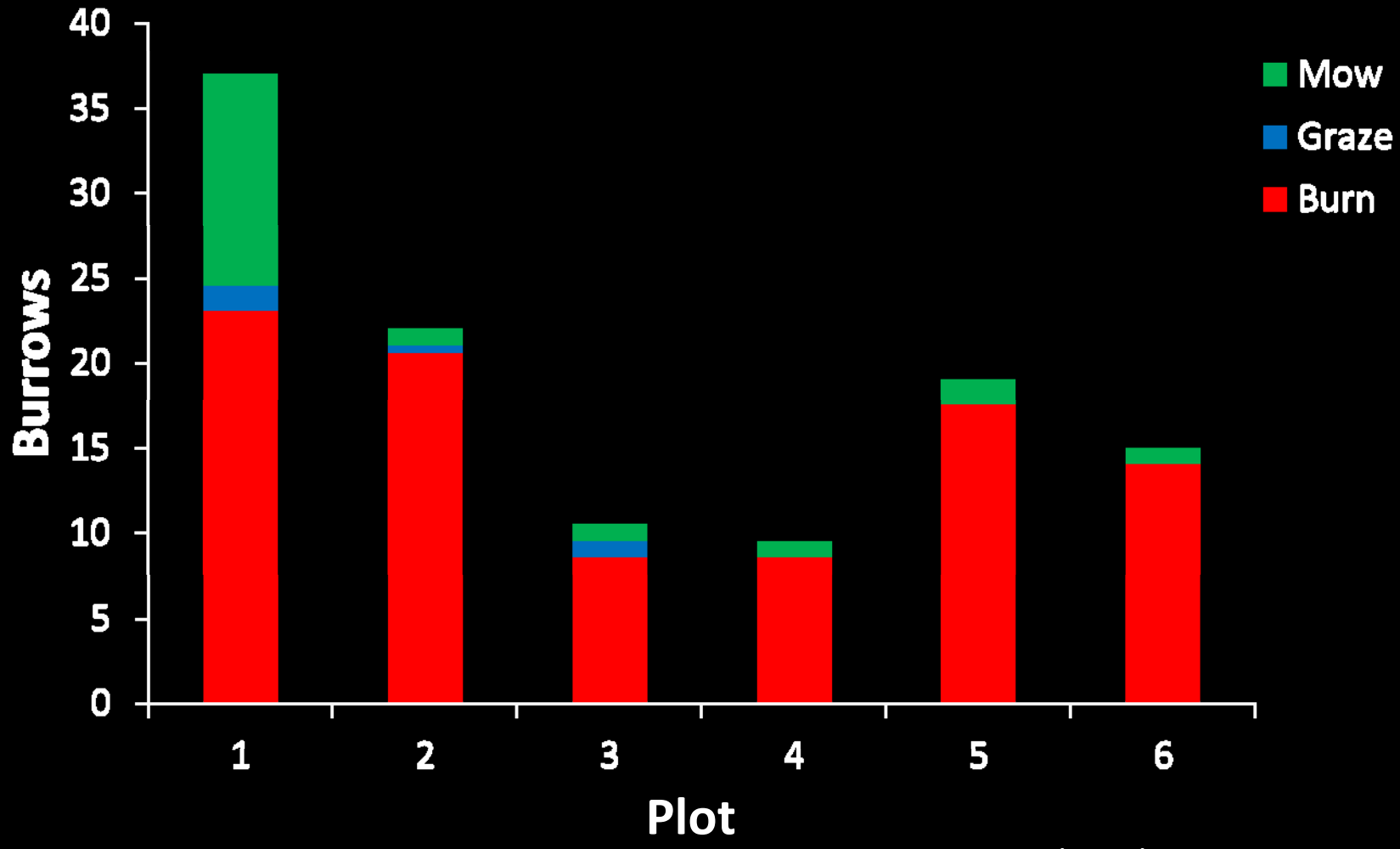

Graze
Mow
Burn

Timeline

* Herbicide & seedling additions

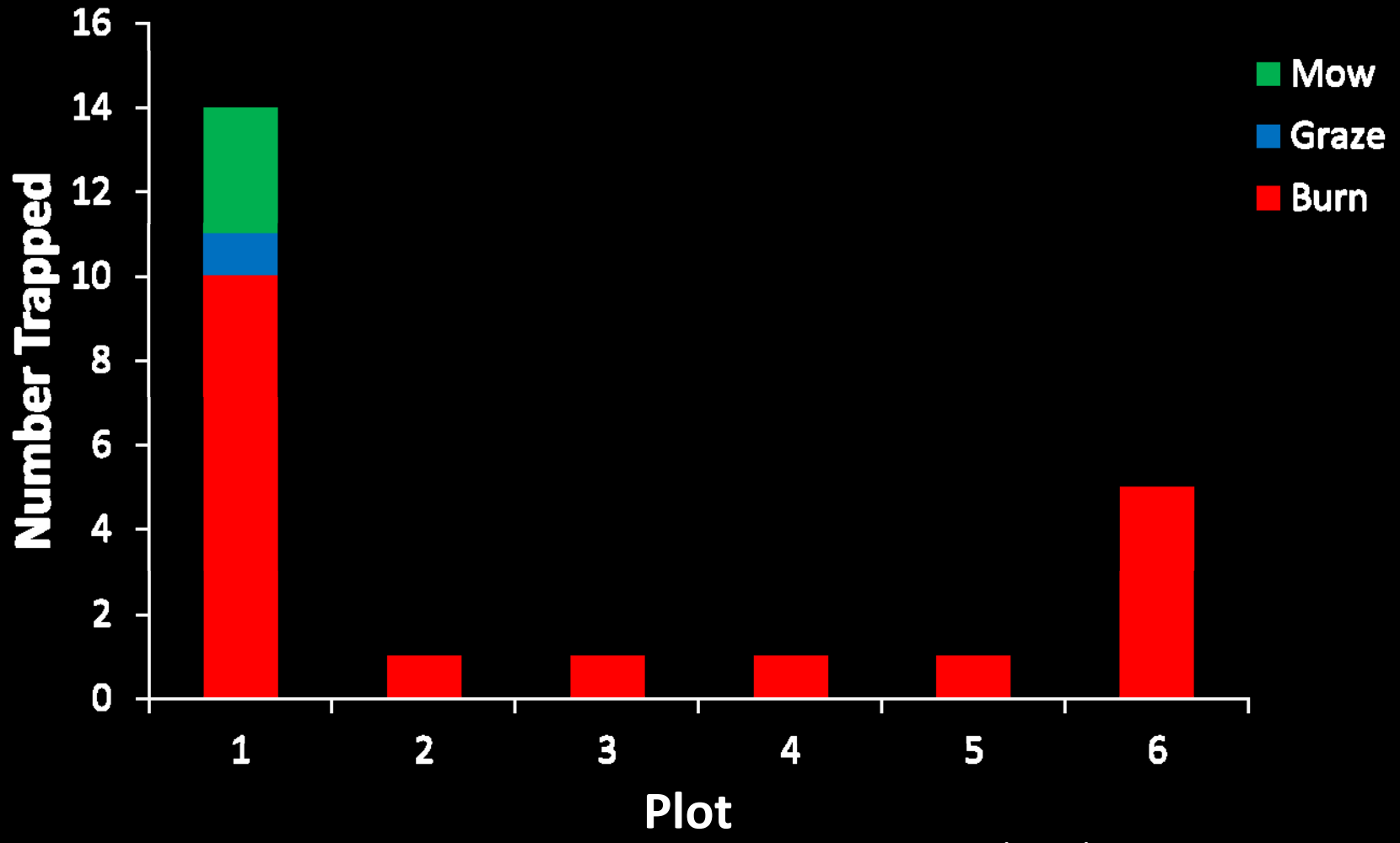
Time	Activity
May/June 2010	Graze, burn, mow
Sept/Oct 2010	SKR translocations
Dec. 2010	Glyphosate application
Jan. 2011	Seedling additions
Jan. 2012	Seedling additions

Immediate Effects of Vegetation Opening on SKR recruitment



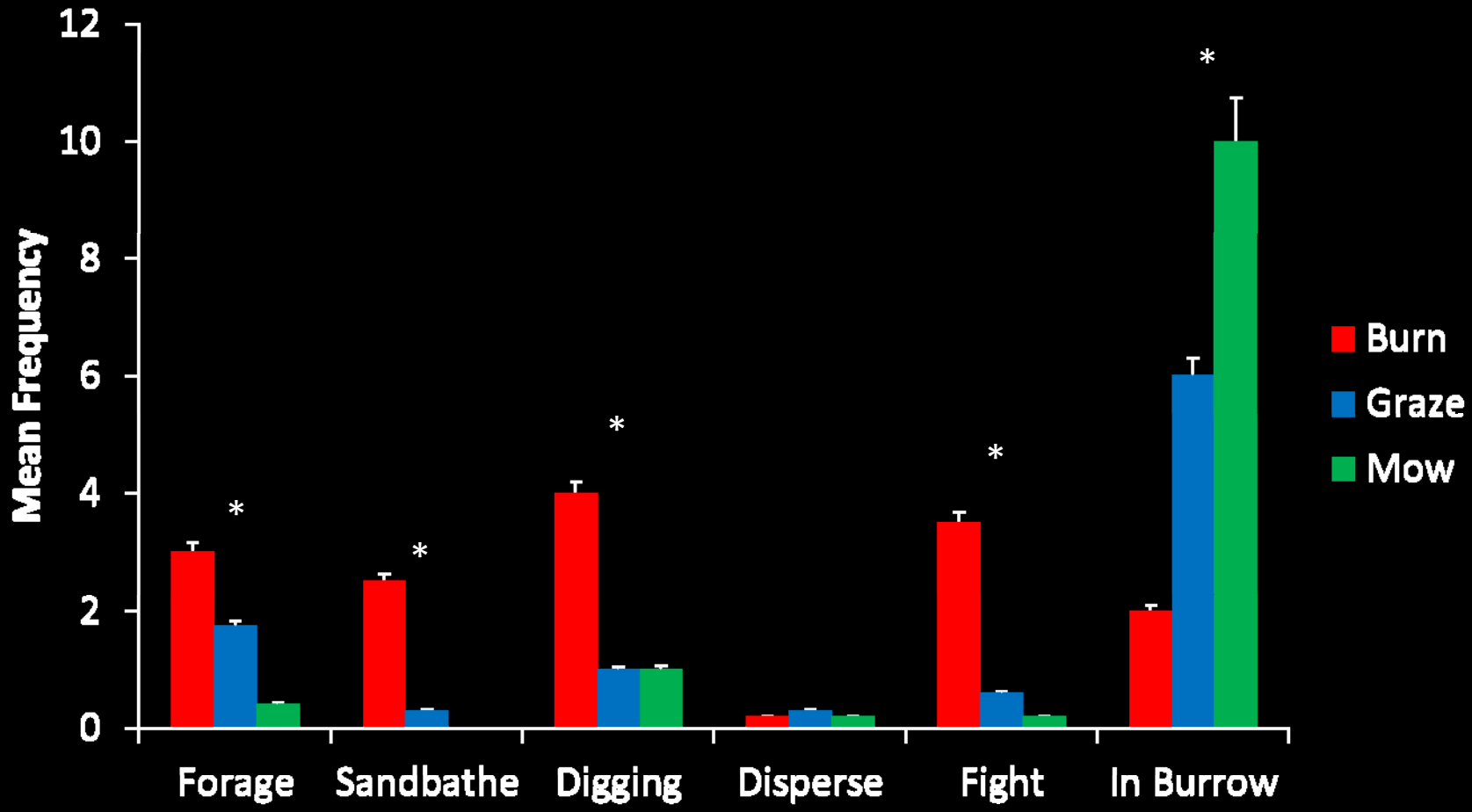
ANOVA: F(2,35) = 21,070, p <0.0001

Immediate Effects of Vegetation Opening on SKR Burrow Establishment

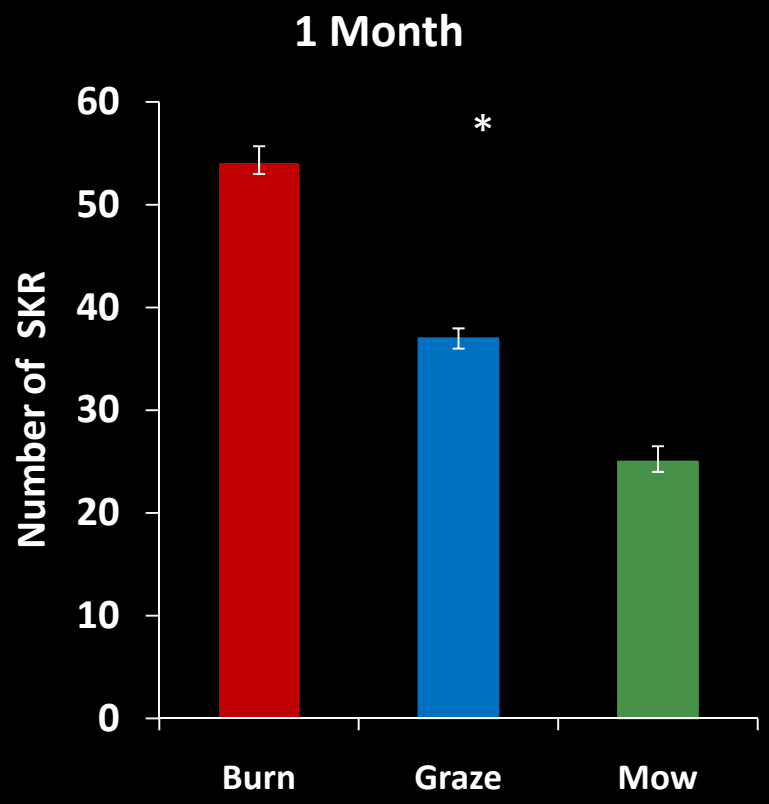


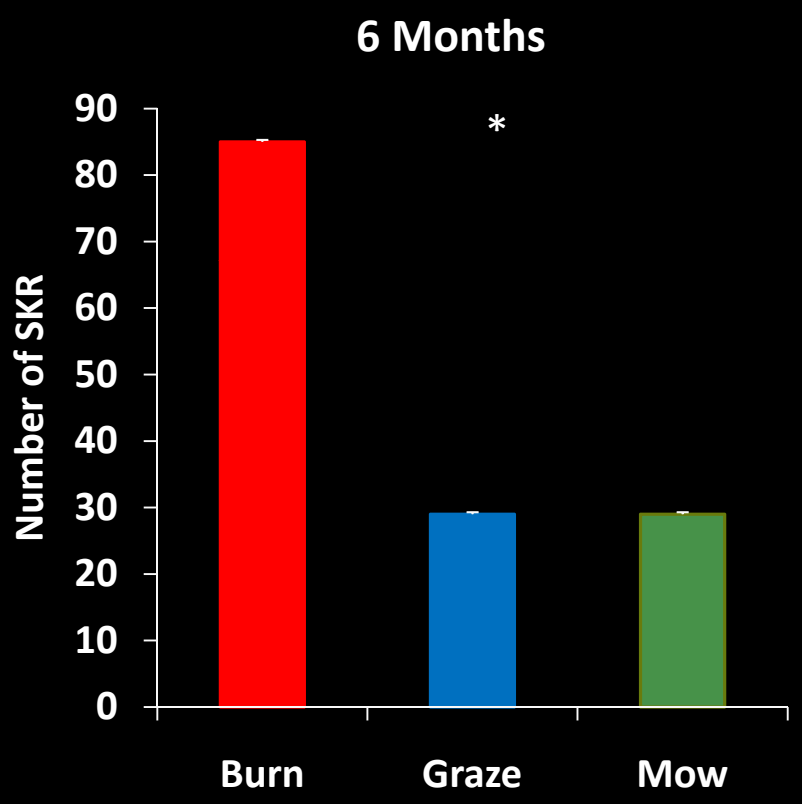
F (2,35) = 5.567, P = 0.008

Effects of Veg Management on Post-release Behavior

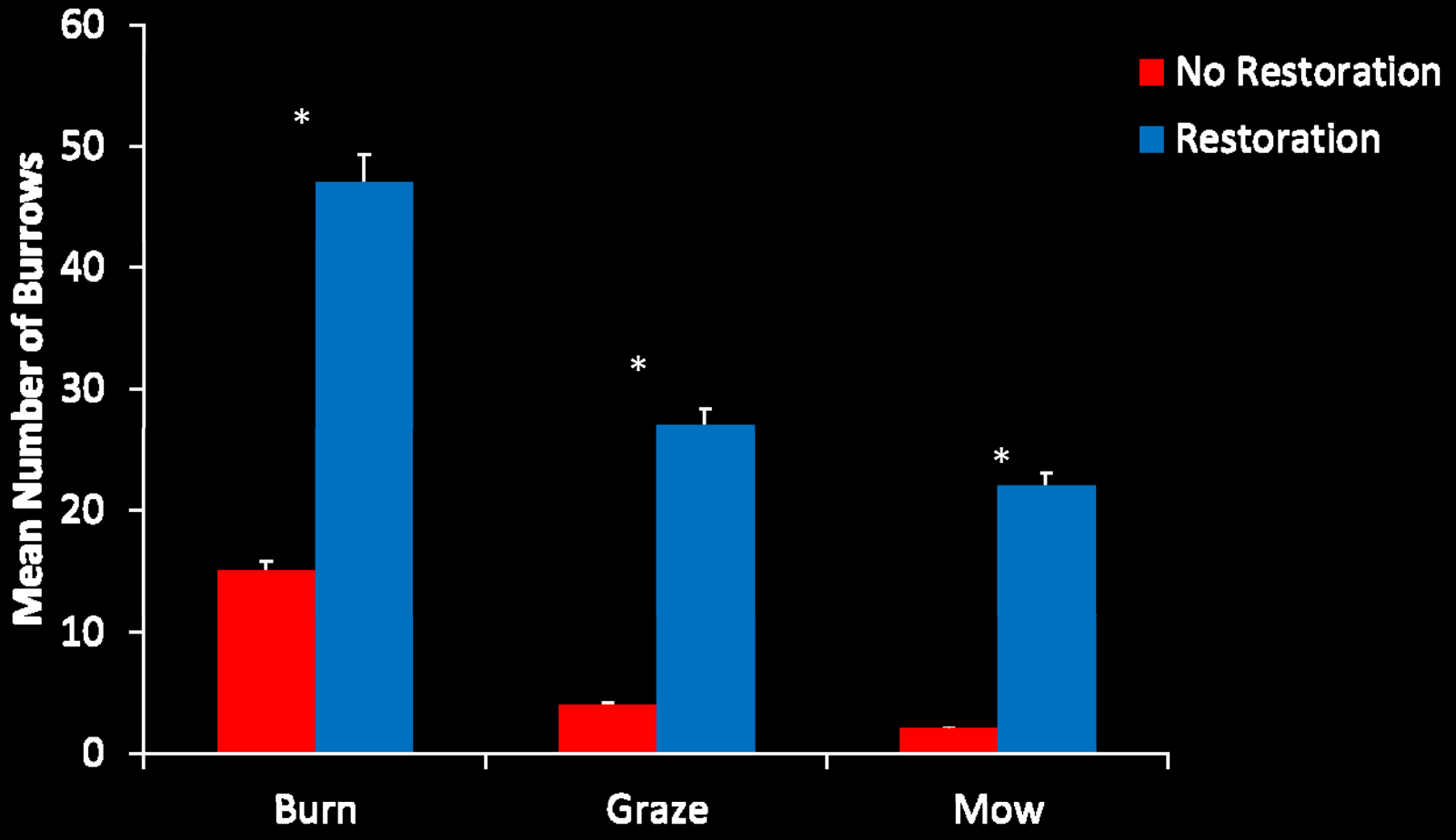


Effects of Vegetation Management on Translocation Success

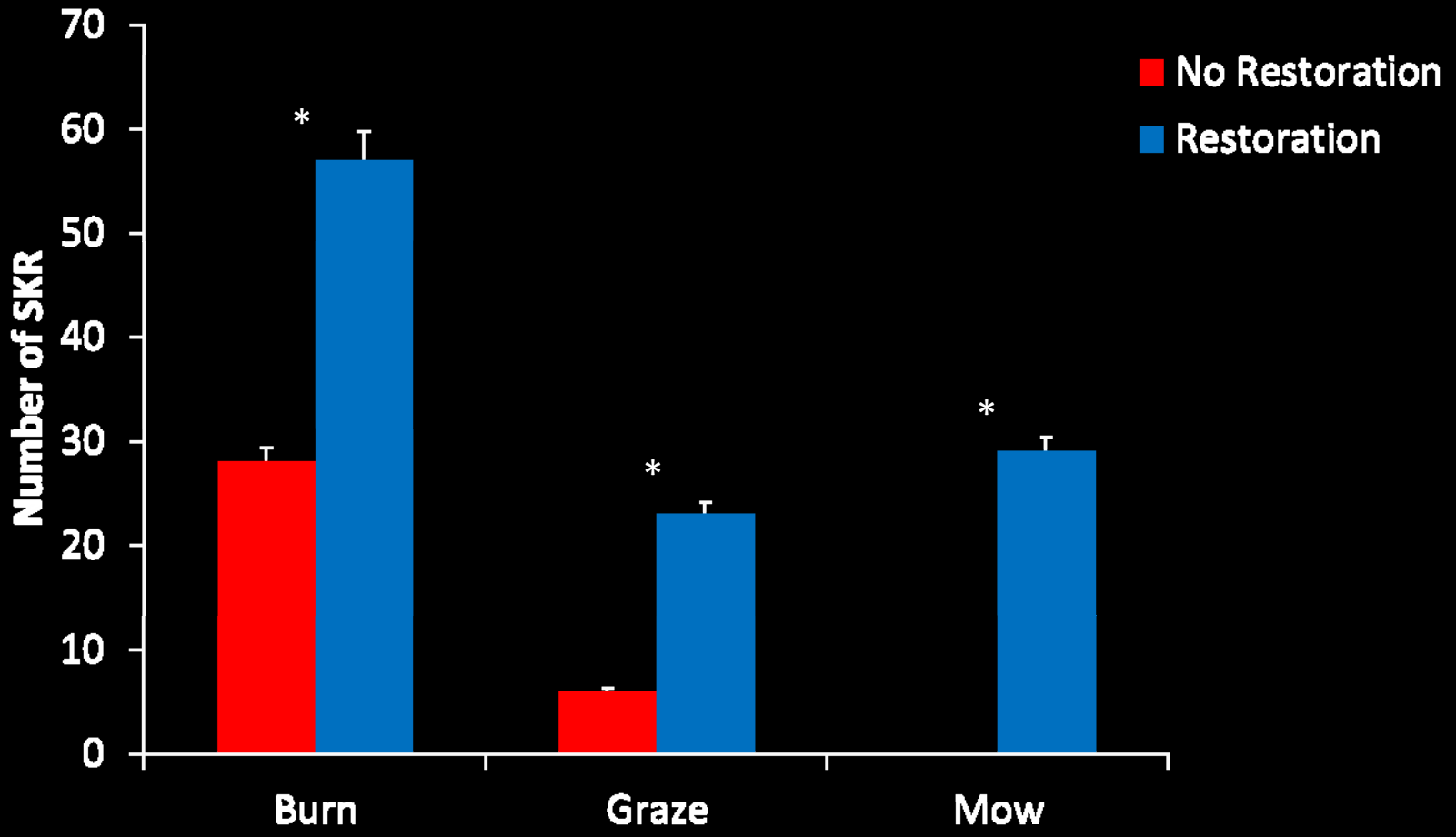




Effects of Restoration on SKR Burrow Establishment



Effects of Restoration on SKR Fitness



Native Grass Seedling Addition

Seedling Mix

Species	Number	Density per m^2	Proportion (%)
Nasella cernua	8,190	0.29	41%
Nasella pulchra	10,062	0.39	50%
Melica imperfecta	1,854	0.07	9%
Total	20,106	0.75	100%

Survival rate from 2011:
88% $\pm$ 0.03

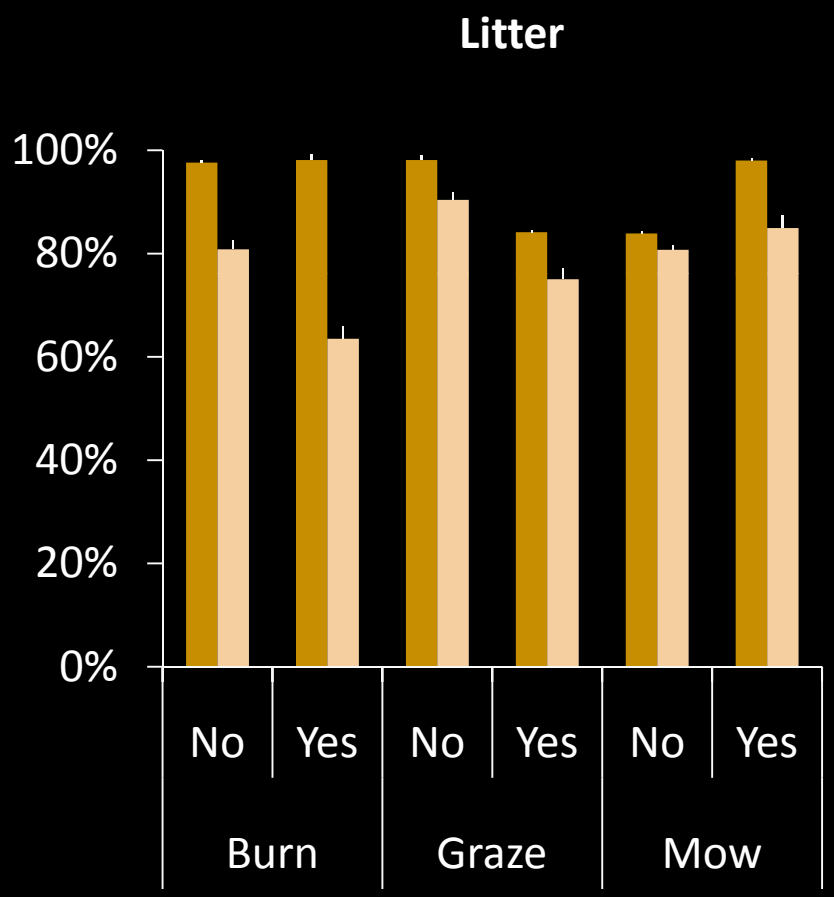

Avena, *Bromus* spp., *Erodium* spp., *Brassica* spp.
Pre-treatment 2010

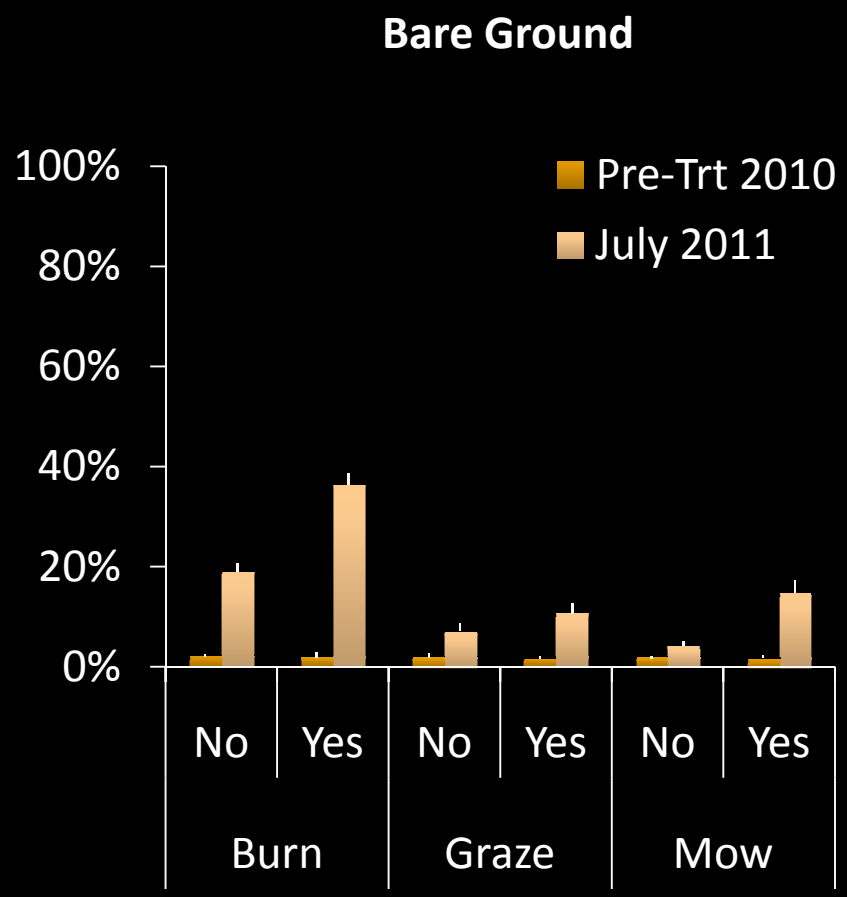

Amsinkia, *Croton*, *Cryptantha*, *Deinandra*, etc.
Post-treatment 2010

Mow plot, Spring 2011


Burn plot, Spring 2011

Short-term responses





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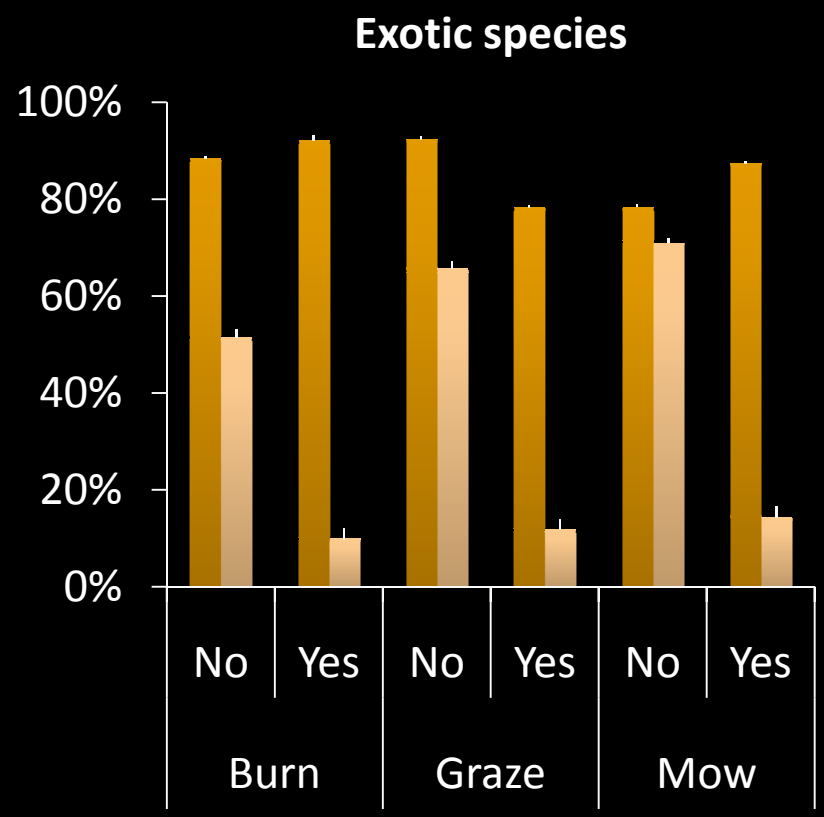
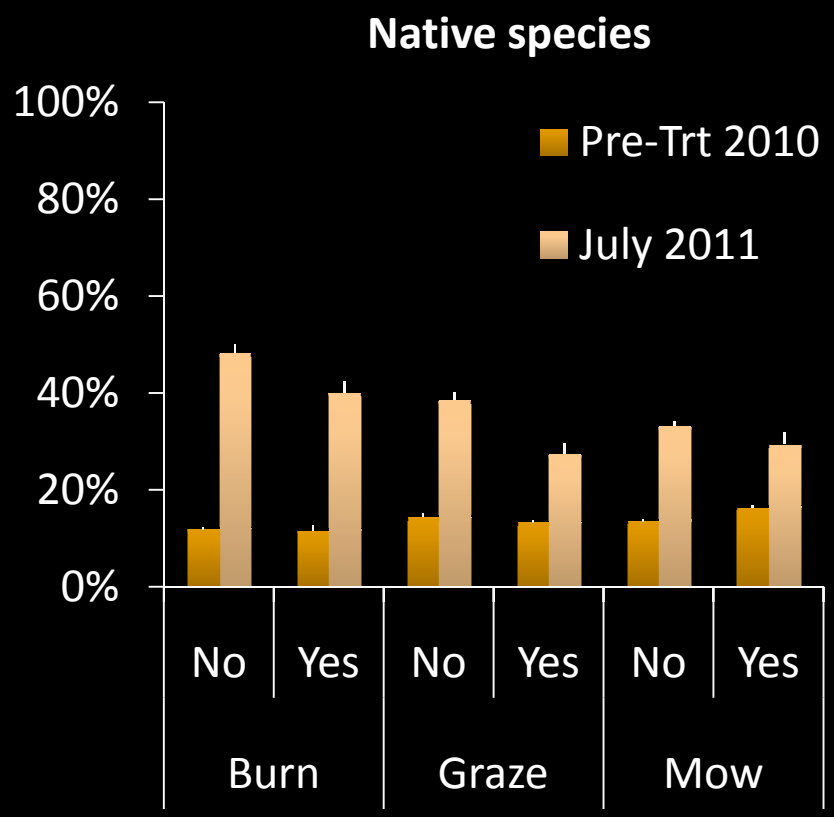
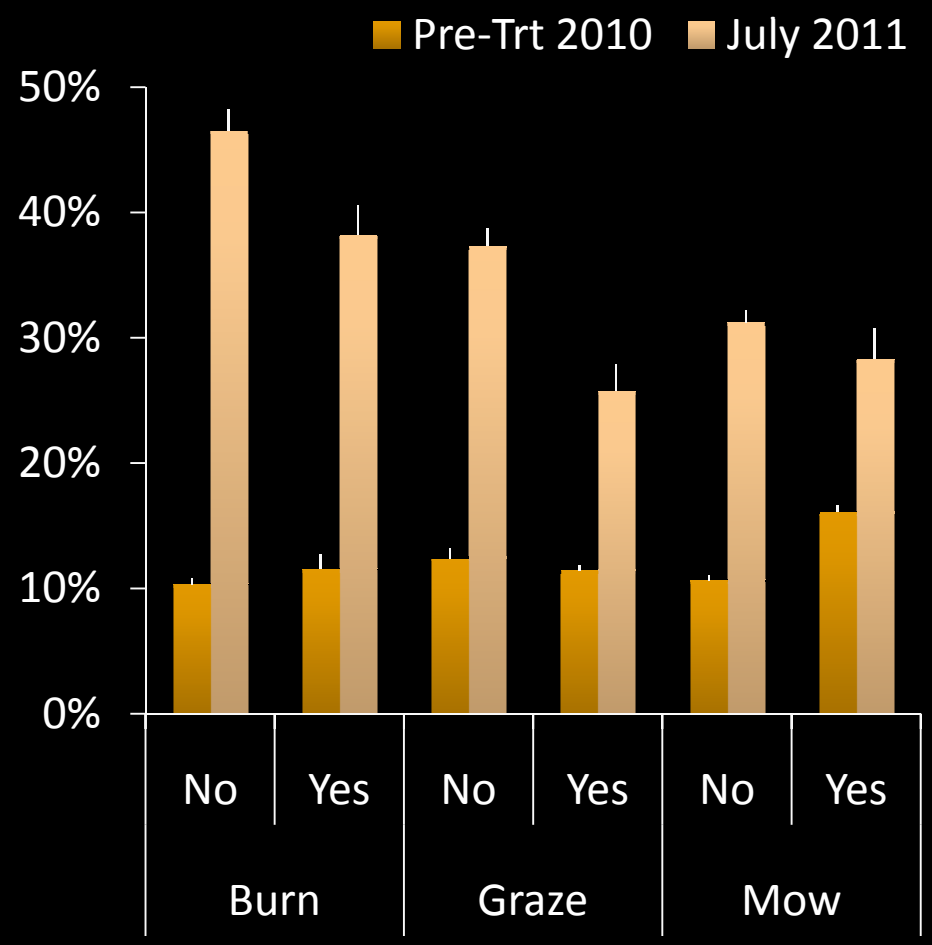




Native forb release



Species	**Common name**
Amsinkia menzesii	Fidleneck
Antirrhinum nuttallianum	Nuttall's Snapdragon
Calandrinia ciliata	Red maids
Camissonia bistorta	California sun cup
Camissonia strigulosa	Sandy-soil Suncup
Castilleja exserta	Purple Owl's Clover
Clarkia purpurea	Purple clarkia
Croton setigerus	Doveweed
Cryptantha intermedia	Common cryptantha
Deinandra fasciculata	Clustered tarweed
Eschscholzia californica	California poppy
Nemophila menziesii	Baby blue-eyes
Stephanomeria exigua	Small wirelettuce
Trichostema lanceolatum	Vinegarweed
Calochortus splendens	Splendid mariposa lily
Chamaesyce albomarginata	Rattlesnake weed
Corethrogyne filaginifolia	Common sandaster
Dichelostemma capitatum	Blue dicks
Mirabilis laevis	California four o'clock

Implications

- Long-term implications unclear
- Role of SKR in affecting structure & composition
- Underlying causes of exotic plant dominance
- Spatial and/or temporal separation of seeding and SKR translocations

Implications for Translocation Methodology

Vegetation management that includes controlled fire is most effective for release success and facilitates habitat restoration

Release site preparation that includes fire, herbicide and grass plugs can substantially improve SKR translocation success

Reserve Manager, Christine Moen
Southwestern Riverside County
Multispecies Reserve

Institute for Conservation Research
Applied Animal Ecology
Applied Plant Ecology

Private Landowners

RCHCA
RIVERSIDE COUNTY HABITAT CONSERVATION AGENCY