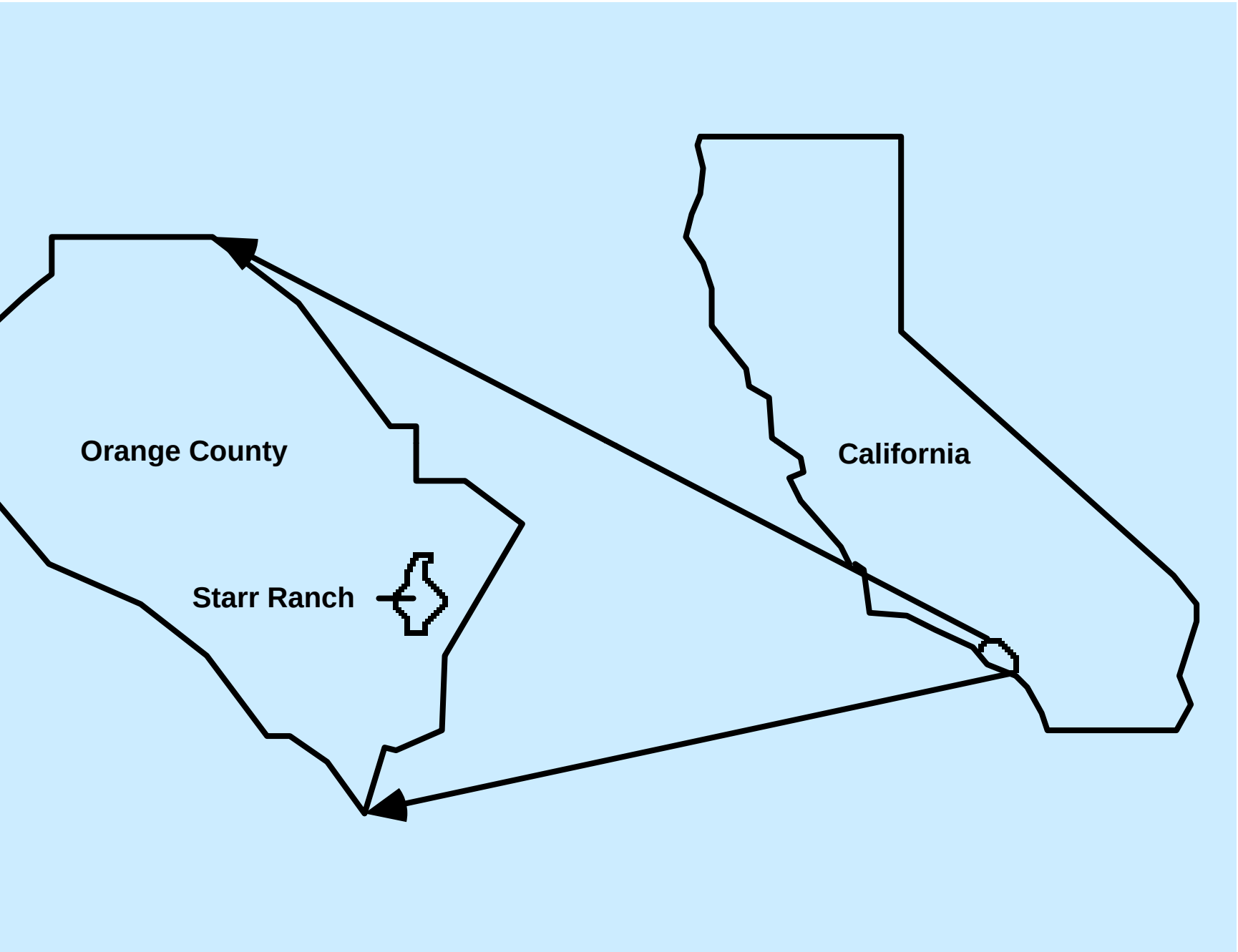
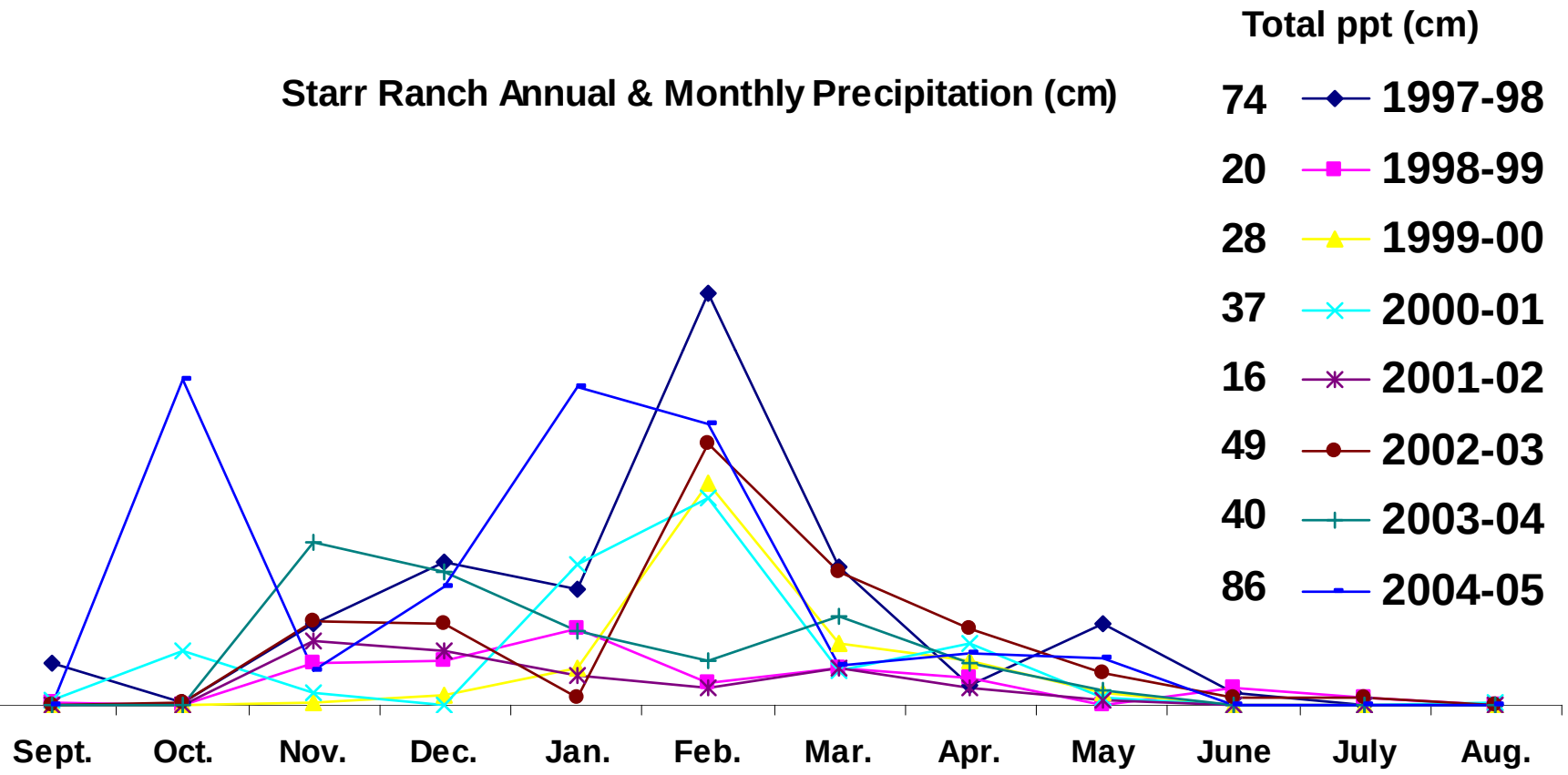
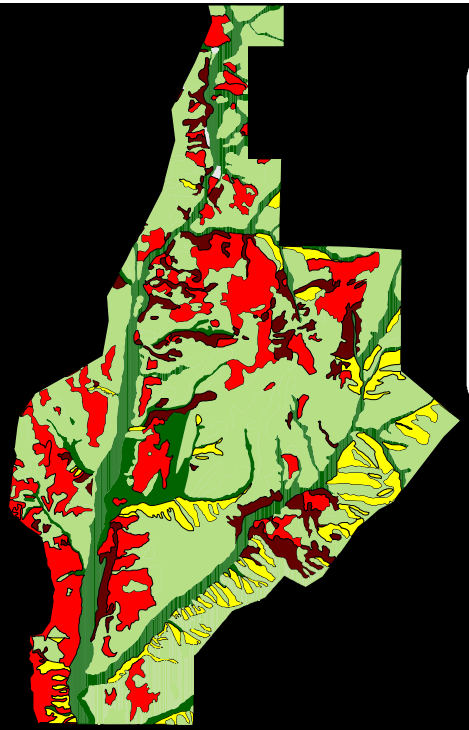
Effects of an exotic herbaceous perennial, *Cynara cardunculus*, on small mammals and songbirds

CALIFORNIA


Orange County
California
Starr Ranch


Starr Ranch Annual & Monthly Precipitation (cm)
Total ppt (cm)
74 1997-98
20 1998-99
28 1999-00
37 2000-01
16 2001-02
49 2002-03
40 2003-04
86 2004-05
Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.

derally Threatened under the
Endangered Species Act



Starr Ranch Vegetation

- Oak Woodland
- Coastal Sage Scrub
- Riparian Woodland
- Grassland
- Chaparral

CA State Species of Special Concern

Starr Ranch Upland ISC&R Team

ager Pete DeSimone

Field Crew Leaders: Matt Lechmaier, Jenny McCabe, Brent Bachelder, John Dvorak, Greg Parks, Justin Valliere

ld Assistants

drey Albrecht
m Archer
slie Boby
ris Boever
n Breen
ala Cummings
nessa Cunningham
ke Davidson
trick Duggan
ss Hammersley
Ben Henshaw
Sara Kaiser
Sergey Khomenko
Sasha Keyel
Dave Kimble
Rich LaPaix
Scott Lillie
Belinda Lo
Doug Manning
Erynn Maynard
Thad Miller
Jon O'Brien
Jeff Rau
Andy Reeder
Melissa Riedel-Lehrke
William Rodriguez
Lindsey Scholl
Jessica Schulte
Daniel Secundy
Stacy Smith
Graham Tuttle
Kim Whorral
Erin Yost

Restoration Assistant, Debbie Gley

Ornithologists

Gail Hall Farmer
Becky Stewart
Stephan Lorenz
Kaia Colestock
Jessica Griffiths
Megan Garfinkel

Margot Griswold, Earthworks Construction & Design

unteers who hoed thistle resprouts, collected, counted, and processed many, many seeds.

Fish & Wildlife Service for "Partners for Wildlife" and "Private Land Stewardship" funding

Terp & Samantha Marcum, U.S. Fish & Wildlife Service

Research-Based Land Management

Active & Passive Adaptive Management”

decisions modified as we learn about the system we are managing”

Shea et al. 2002 Ecol. App. 12

erview - Artichoke thistle control & CSS restoration

ects of thistle control on small mammals and songbirds

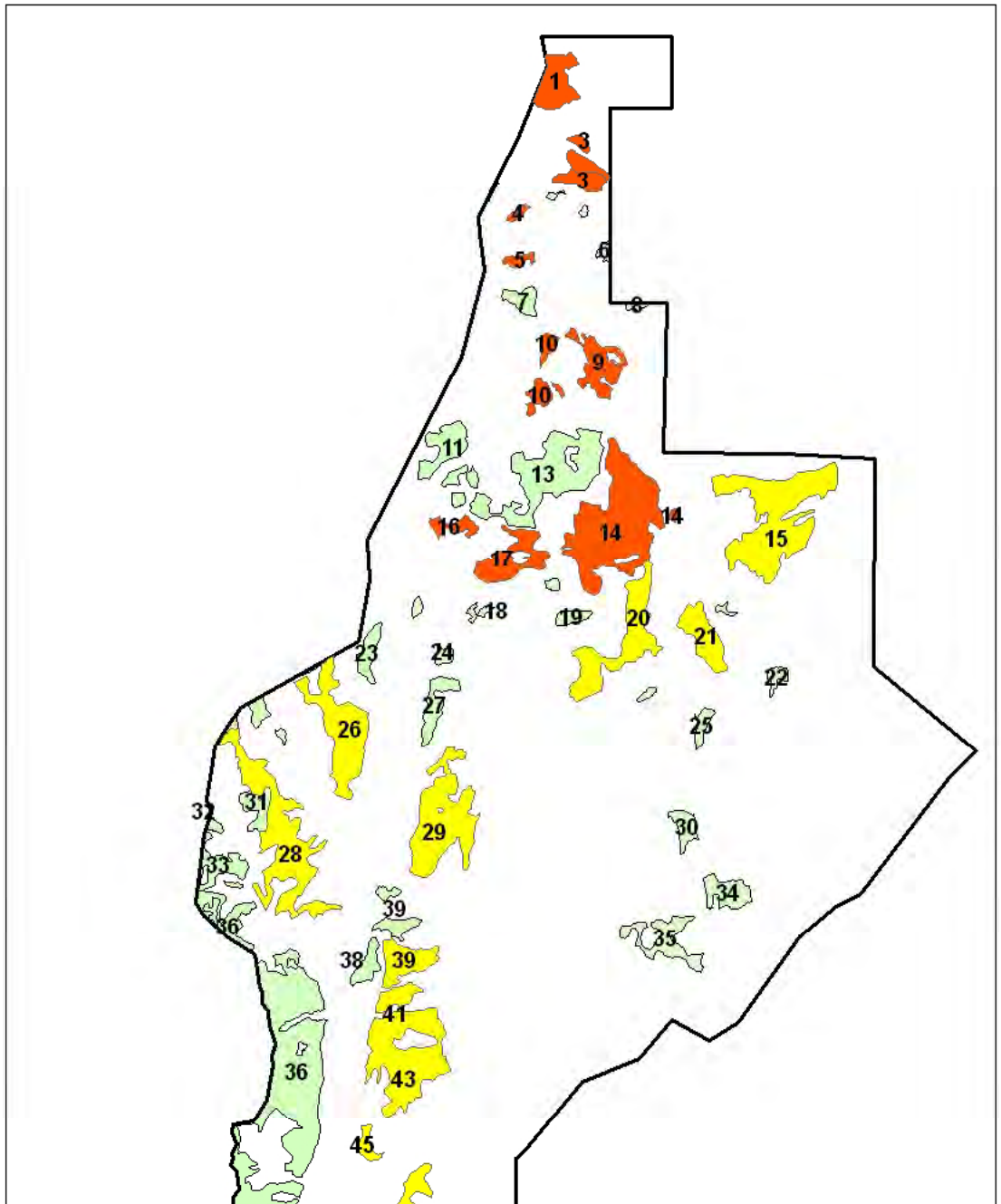
- Challenges
- Spot mapping
- Point counts
- Small mammal trapping

Overview of Artichoke Thistle Control and Subsequent Coastal Sage Scrub Restoration at Starr Ranch

Cynara cardunculus

Artichoke Thistle

700 acres


1
3
3
4
5
6
7
8
10
9
10
11
13
14
14
15
16
17
18
19
20
21
22
23
24
25
26
27
29
30
31
32
33
34
35
36
38
39
39
41
43
45


#28m
PP 1
03/29/01


#4
PP3 T1

ects of Habitat Restoration on Wildlife

Challenges:

1. **Though thistle control reduces cover by 95% per site in one season, restoration success highly variable**
2. **Socal habitat mosaics – small habitat patch size**
3. **Extreme fragility of CSS**

Effects of artichoke thistle control & CSS restoration on songbirds

1. **Spot mapping**

2. **Point counts**

Songbirds

seful indicators of weed control & restoration success

- easily detected
- readily distinguished to species level

ovide useful information about ecosystem function

- fairly specific habitat requirements
- high levels energy expenditure
- high on the food chain

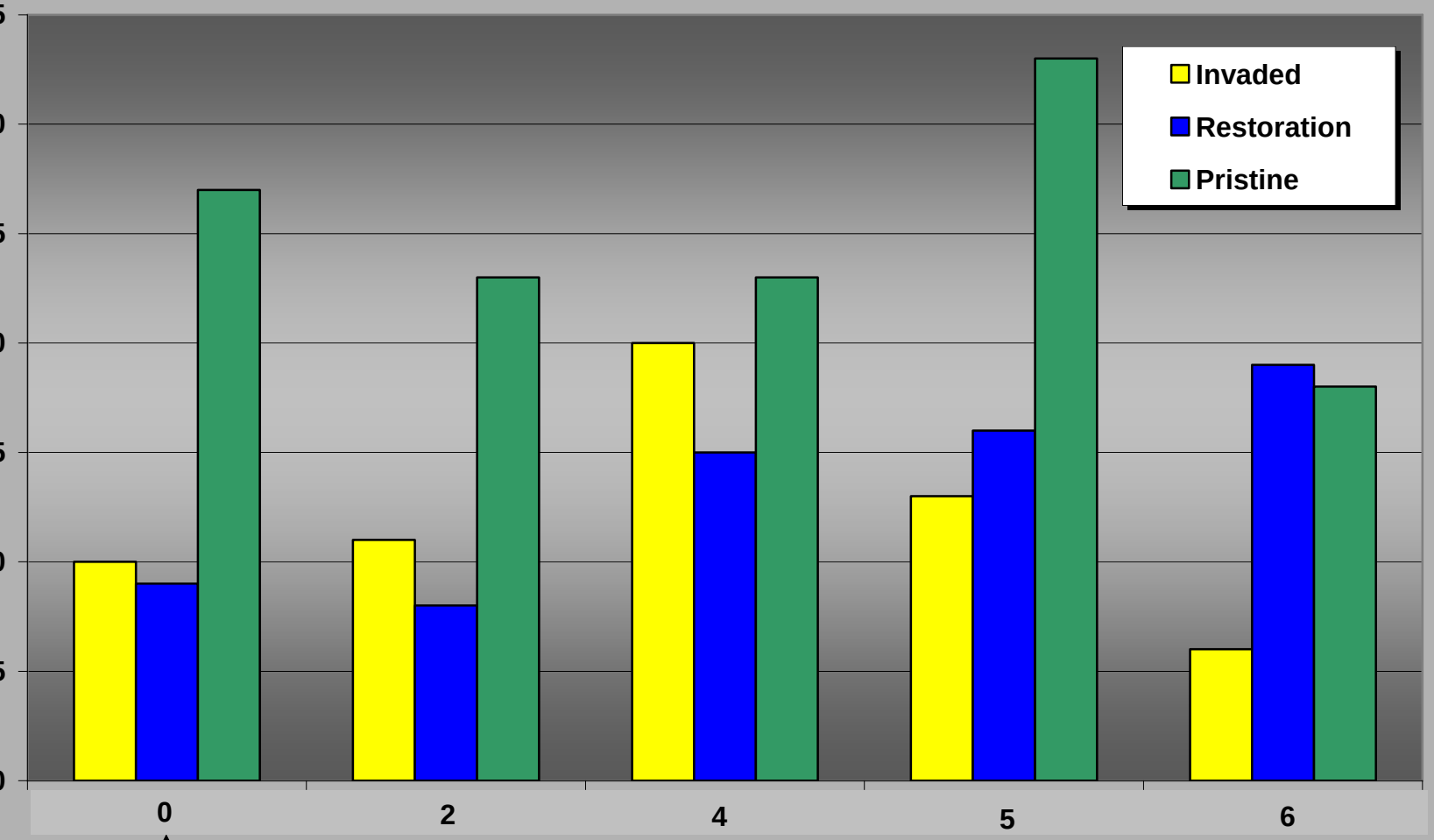
dely comparable data due to standardized field methods

t

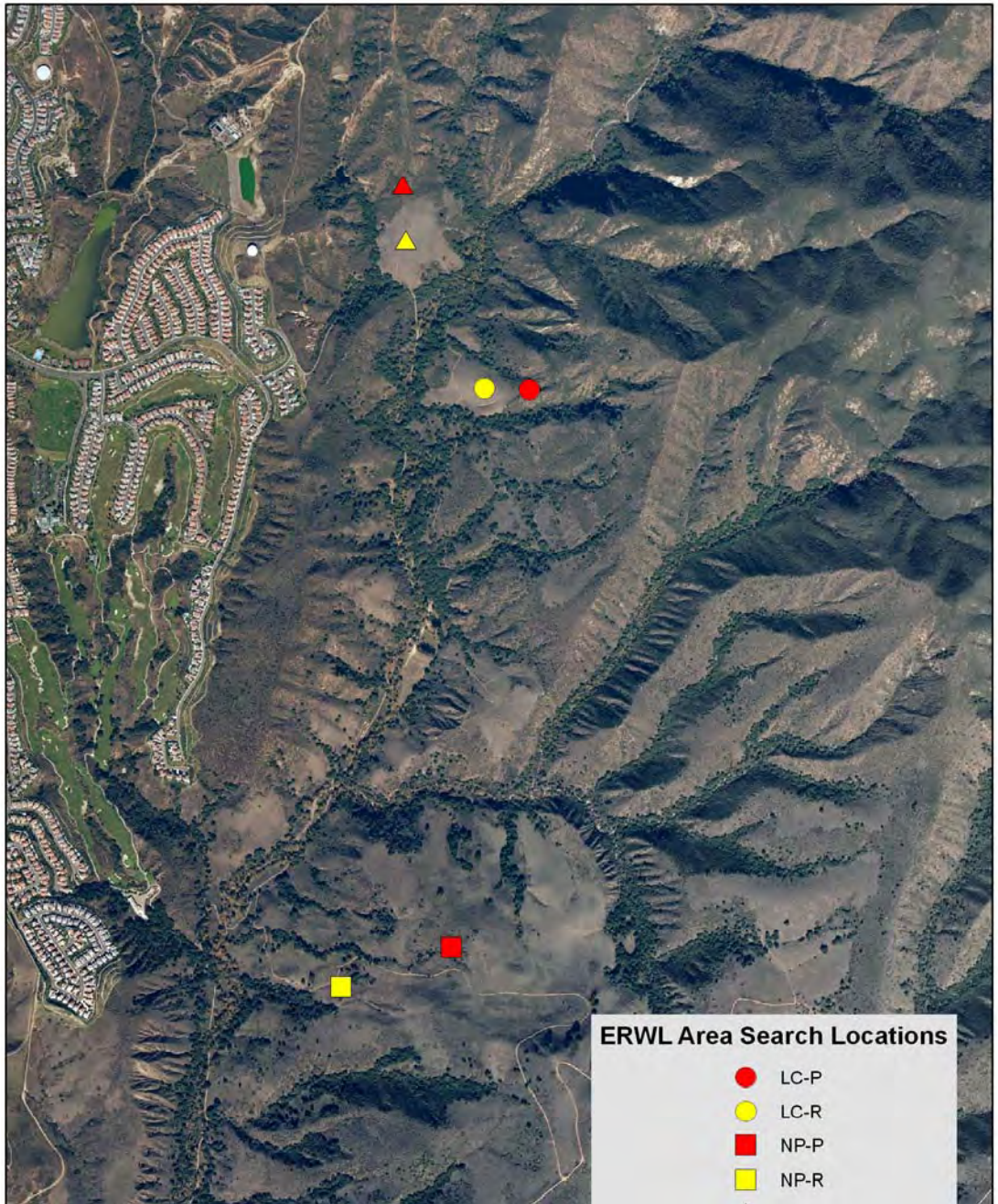
- respond to the environment at multiple spatial and temporal scales
- thus may be strongly influenced by factors outside any one study area

m citations in Golet, G. H. et al. 2008. Wildlife response to riparian restoration on the

Species Richness In Matched Sites



Blue bars = sites of increasing restoration age

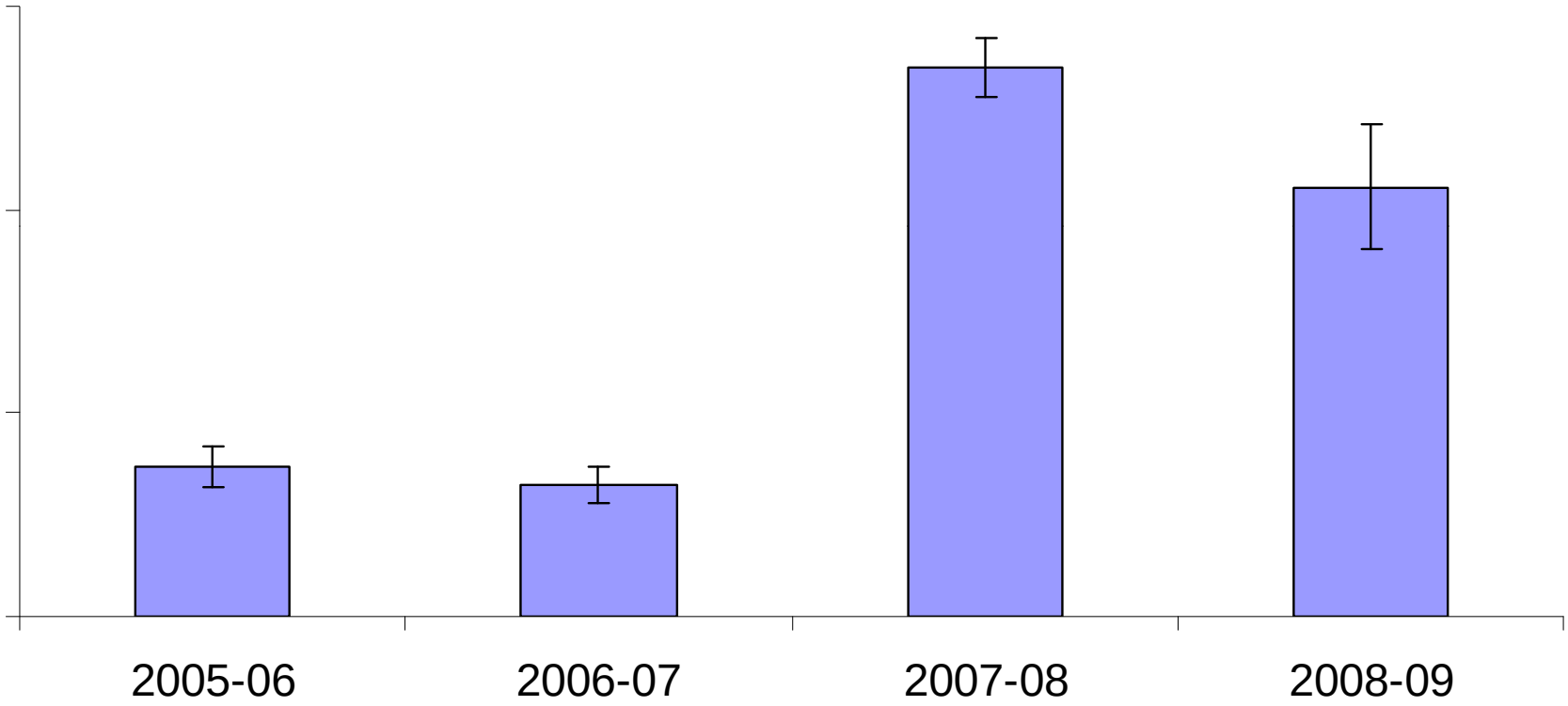

ERWL Area Search Locations
LC-P
LC-R
NP-P
NP-R


PR
PP
25
50
100 Meters

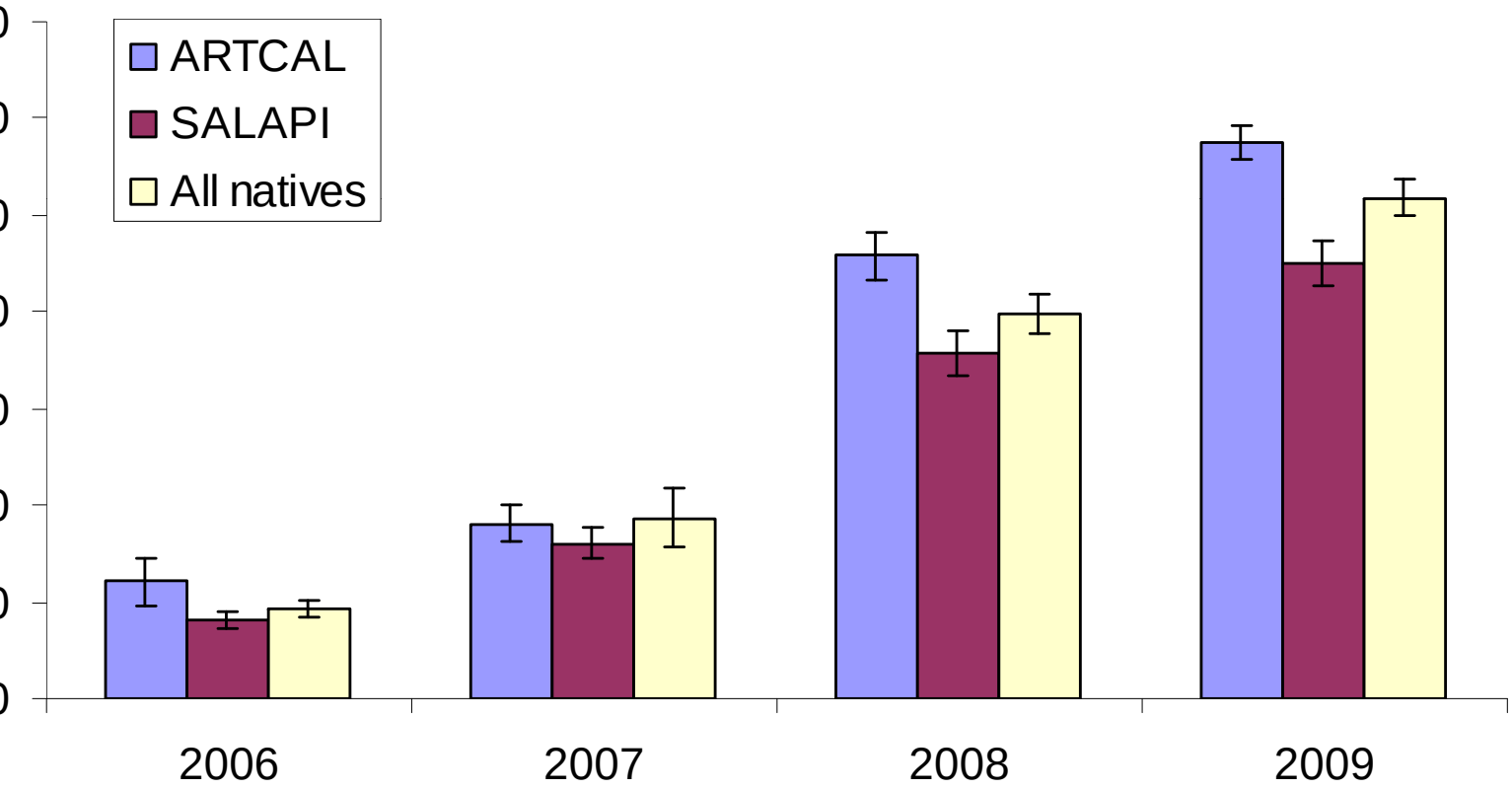

2004

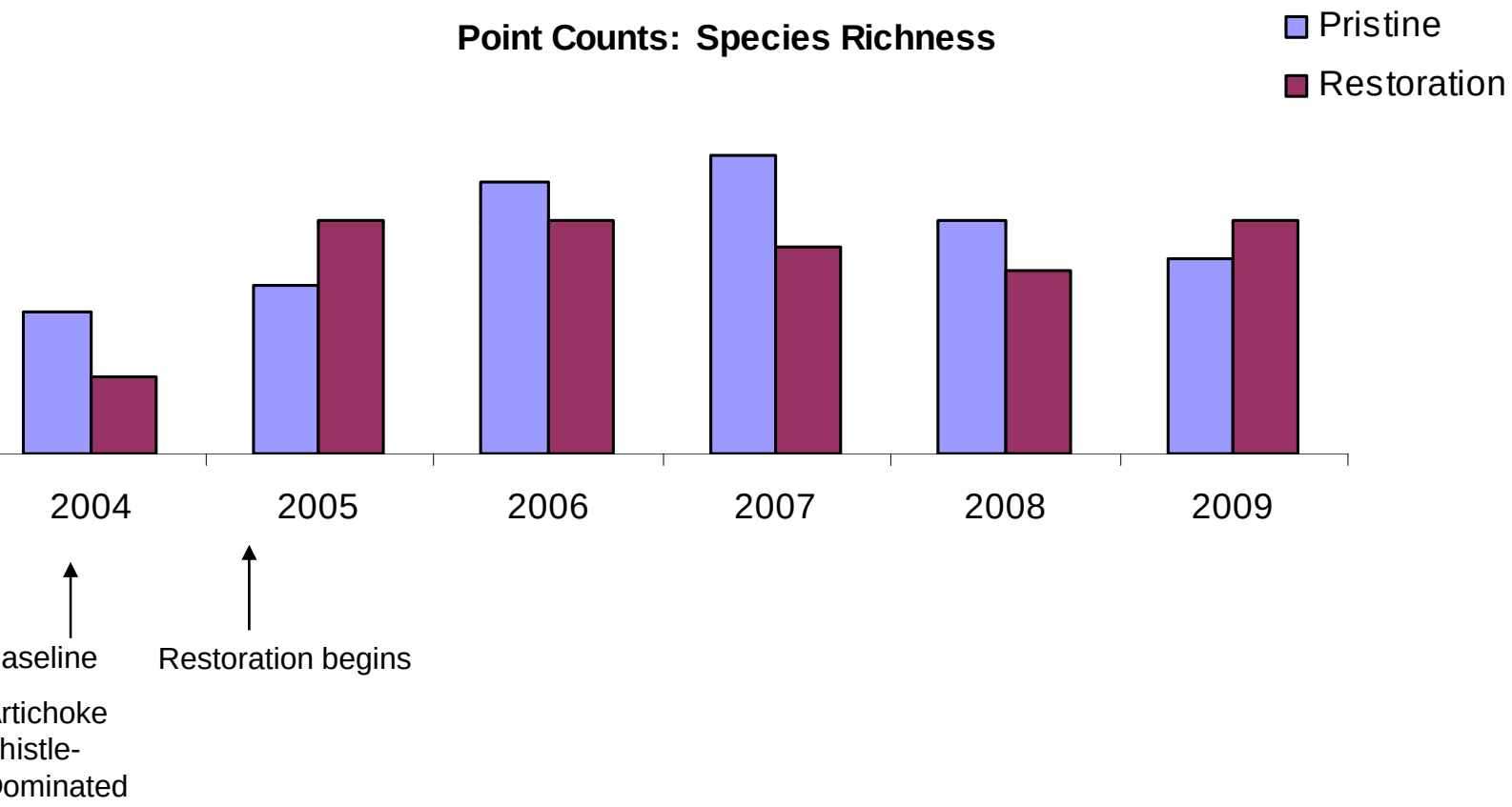
2005

n = 40 one sq meter quads



n = 40




Point Counts: Species Richness
Pristine
Restoration
2004
2005
2006
2007
2008
2009
aseline
Restoration begins
rtichoke
histle-
ominated

Effects of Thistle Control & CSS Restoration

on Small Mammals:

Small Mammal Trapping

In matched pair sites – long term study

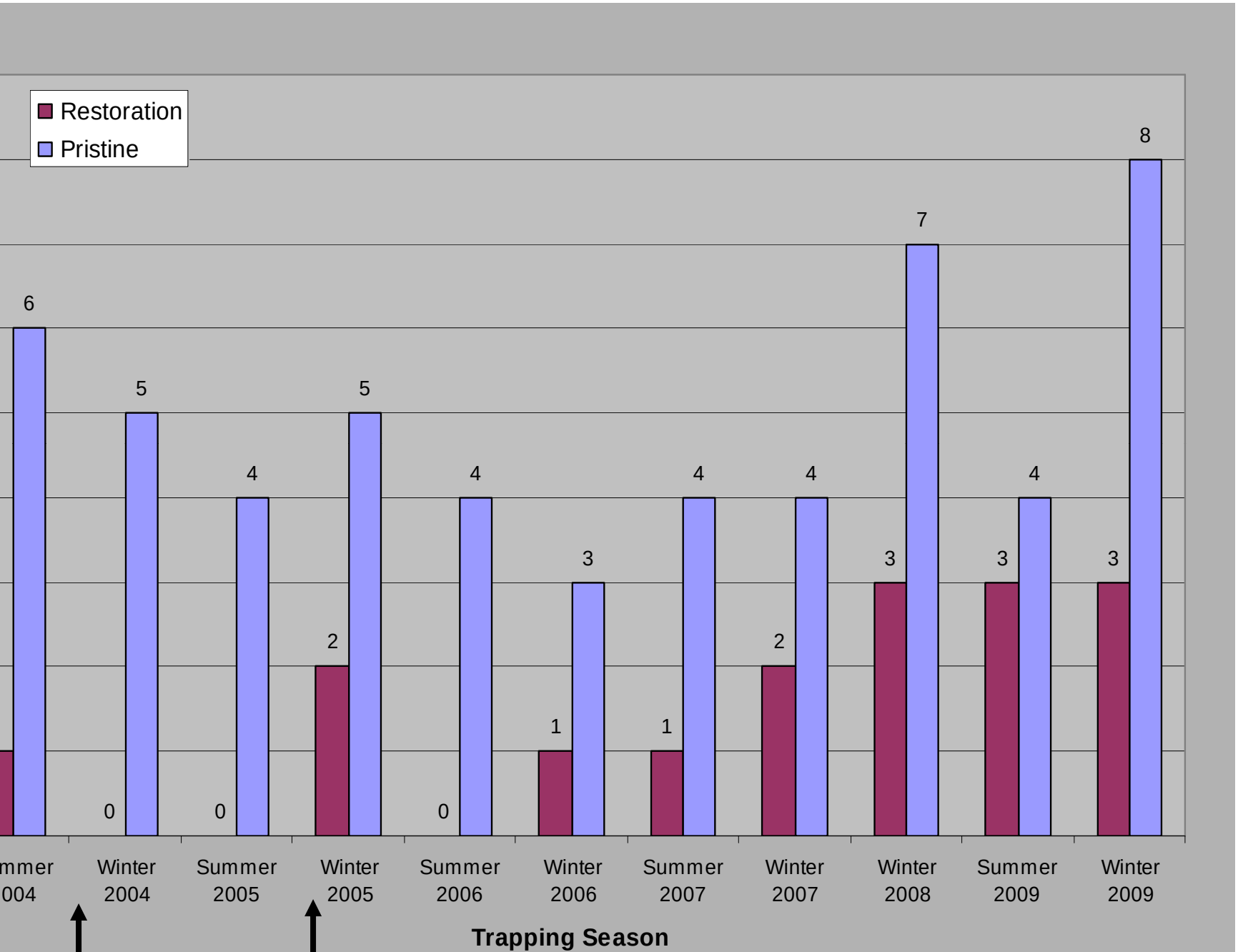
Over a weed control & restoration chronosequence

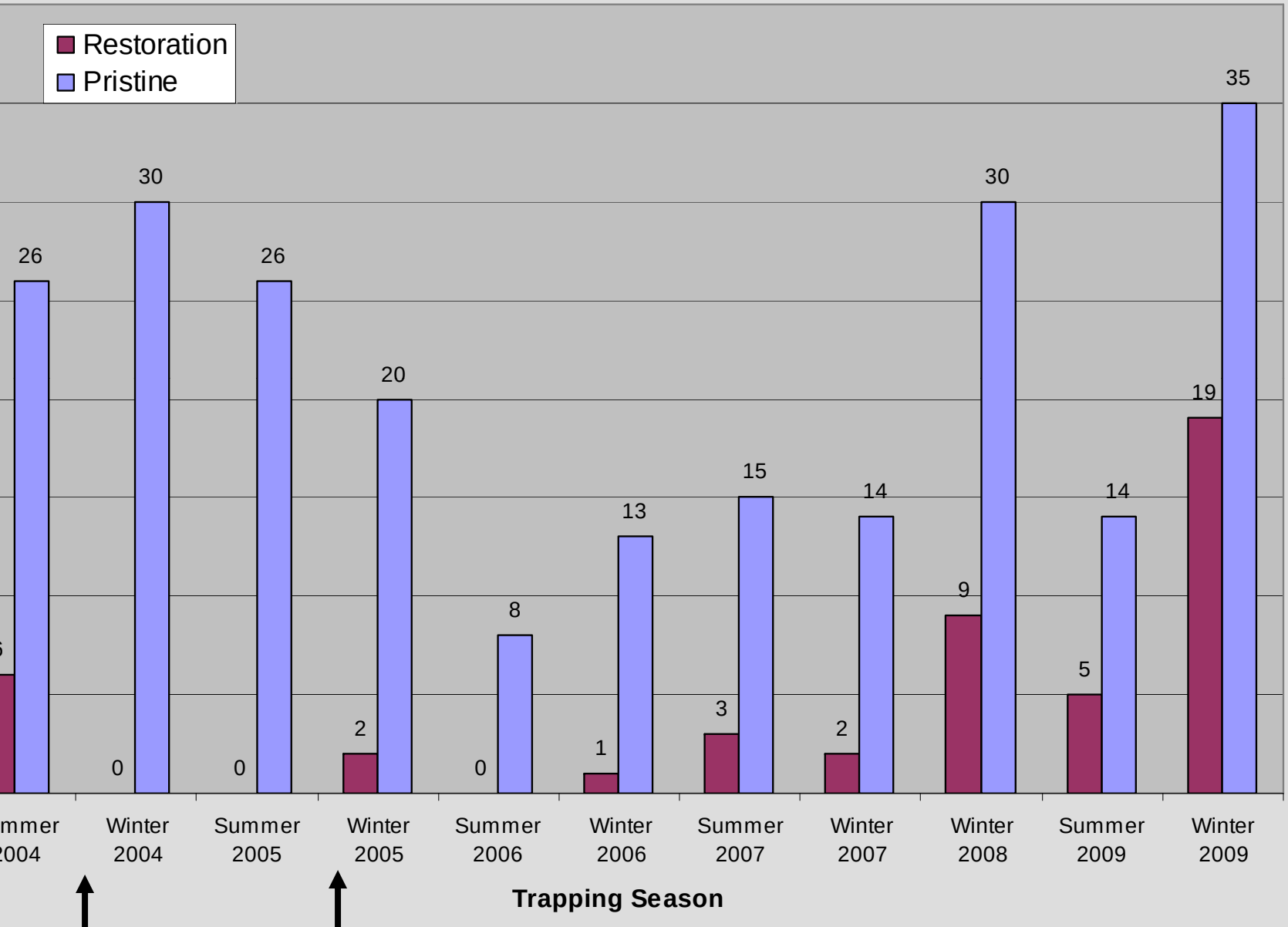
Small mammals can exert strong influence on vegetation patterns in southern CA

DeSimone and Zedler 1999

Small mammal abundances are highly variable

Anderson et al. 2000


Restoration
Pristine
6
0
5
0
4
2
5
0
4
1
3
1
4
2
4
3
7
3
4
3
8
mmer
004
Winter
2004
Summer
2005
Winter
2005
Summer
2006
Winter
2006
Summer
2007
Winter
2007
Winter
2008
Summer
2009
Winter
2009
Trapping Season

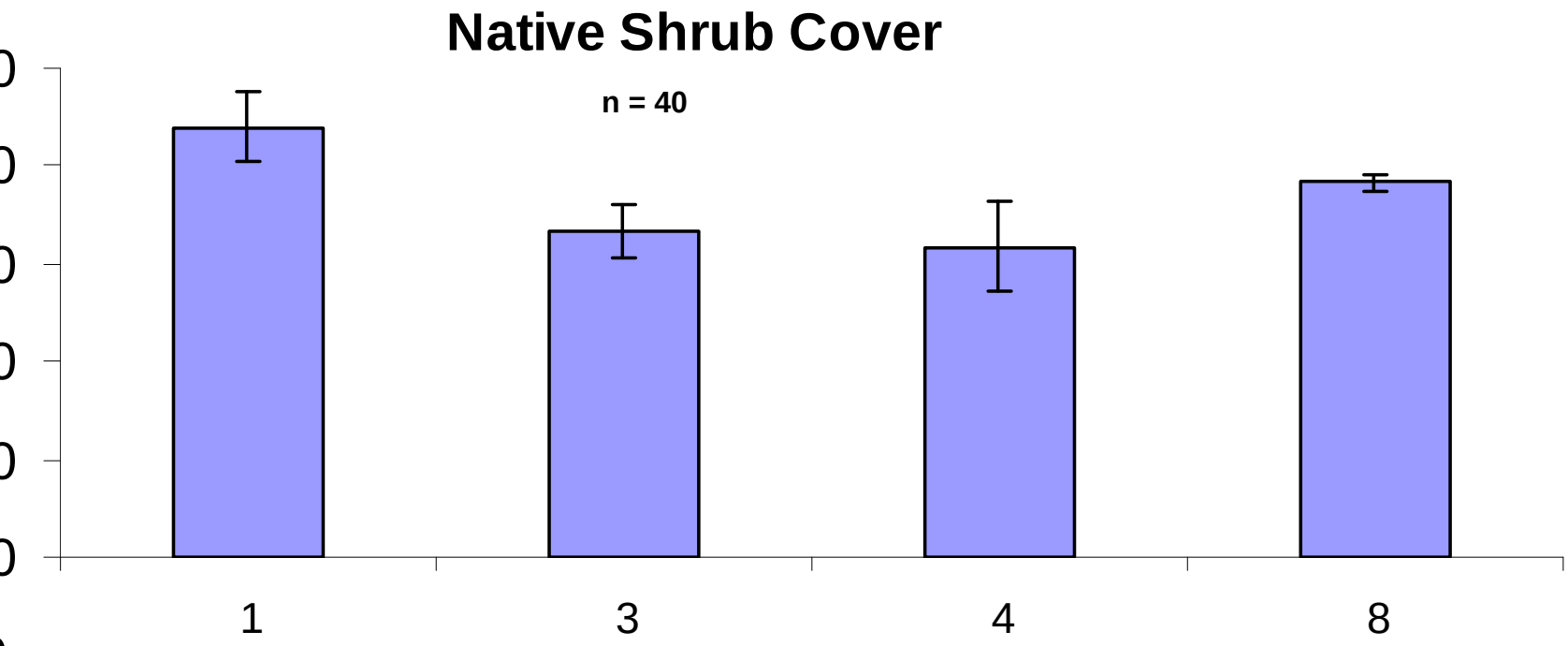

Restoration
Pristine
26
30
26
20
8
13
15
14
30
14
35
19
0
0
2
0
1
3
2
9
5
mmer
2004
Winter
2004
Summer
2005
Winter
2005
Summer
2006
Winter
2006
Summer
2007
Winter
2007
Winter
2008
Summer
2009
Winter
2009
Trapping Season

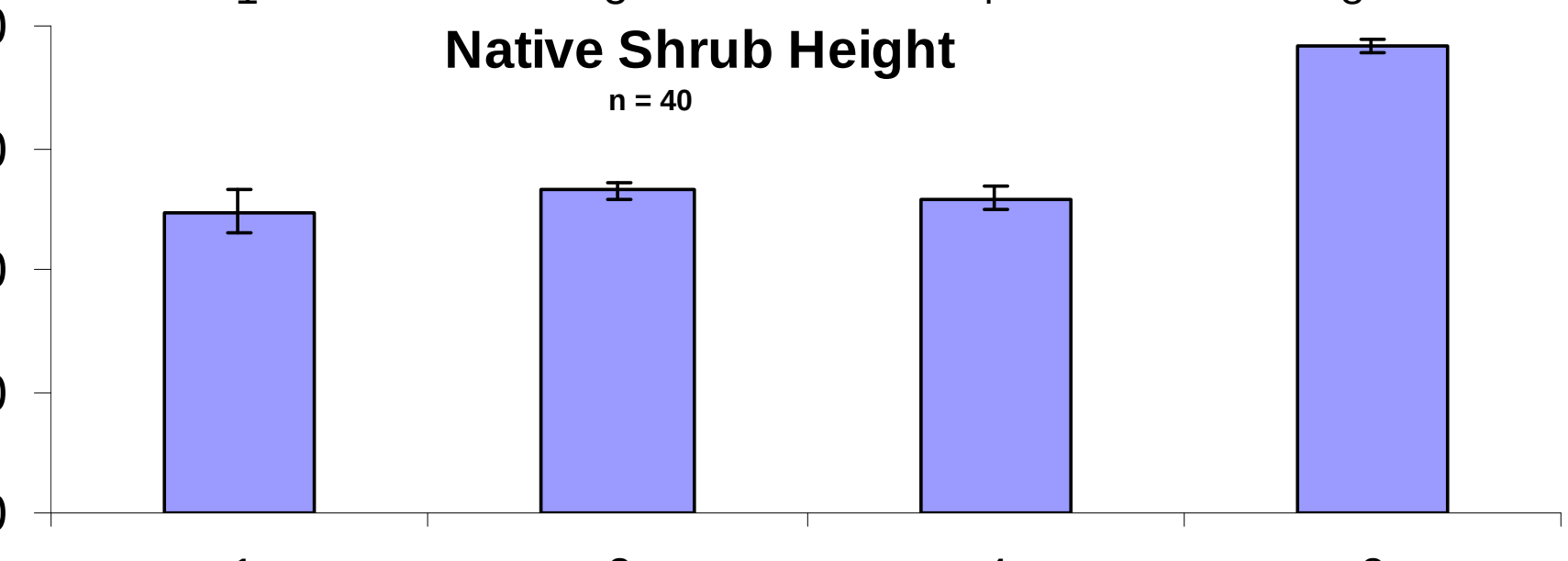
Percent of total captures

	Pristine	Pre-treatment	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
n Mouse *cus boylii*	11.7	-	-	-	-	50.0	28.6	-
s Mouse *cus eremicus*	20.0	-	-	-	-	-	-	-
rnia Mouse *cus californicus*	30.9	-	-	-	25.0	-	-	-
Mouse *cus maniculatus*	0.4	-	-	50.0	-	-	-	-
rnia Pocket Mouse *pus californicus*	3.5	-	-	-	25.0	-	7.1	5.3
ern Harvest Mouse *ontomys megalotis*	3.5	-	-	50.0	50.0	50.0	57.1	21.1
rnia Vole *californicus*	4.3	100.0	-	-	-	-	7.1	73.7
t Woodrat *lepida*	11.7	-	-	-	-	-	-	-
y-footed Woodrat *fuscipes*	13.9	-	-	-	-	-	-	-

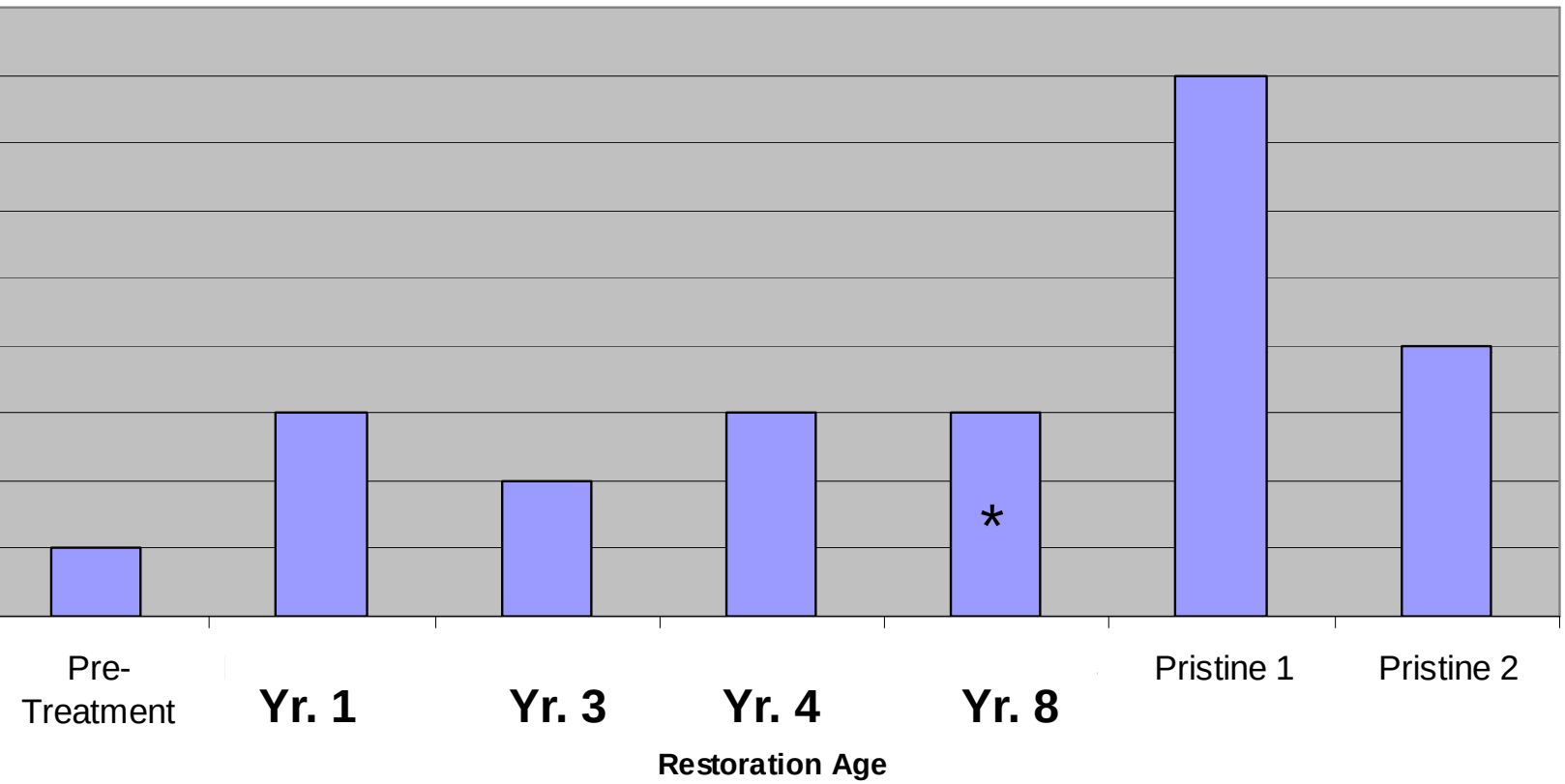
r 1 CSS Restoration

End Year 3 CSS Restoration

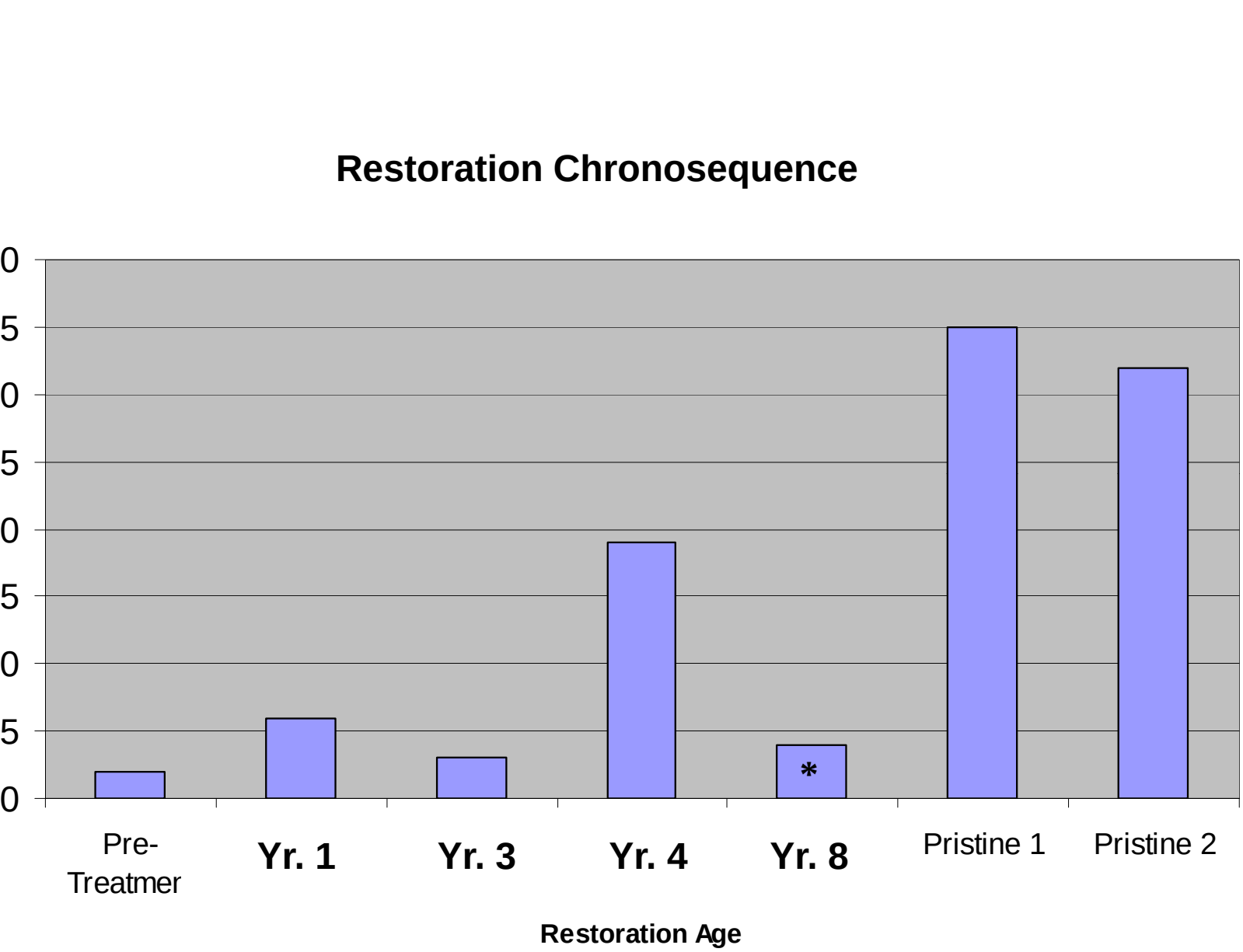

Native Shrub Cover
n = 40
1
3
4
8


Native Shrub Height
n = 40

Restoration Chronosequence



oration 4 grid was only open one night

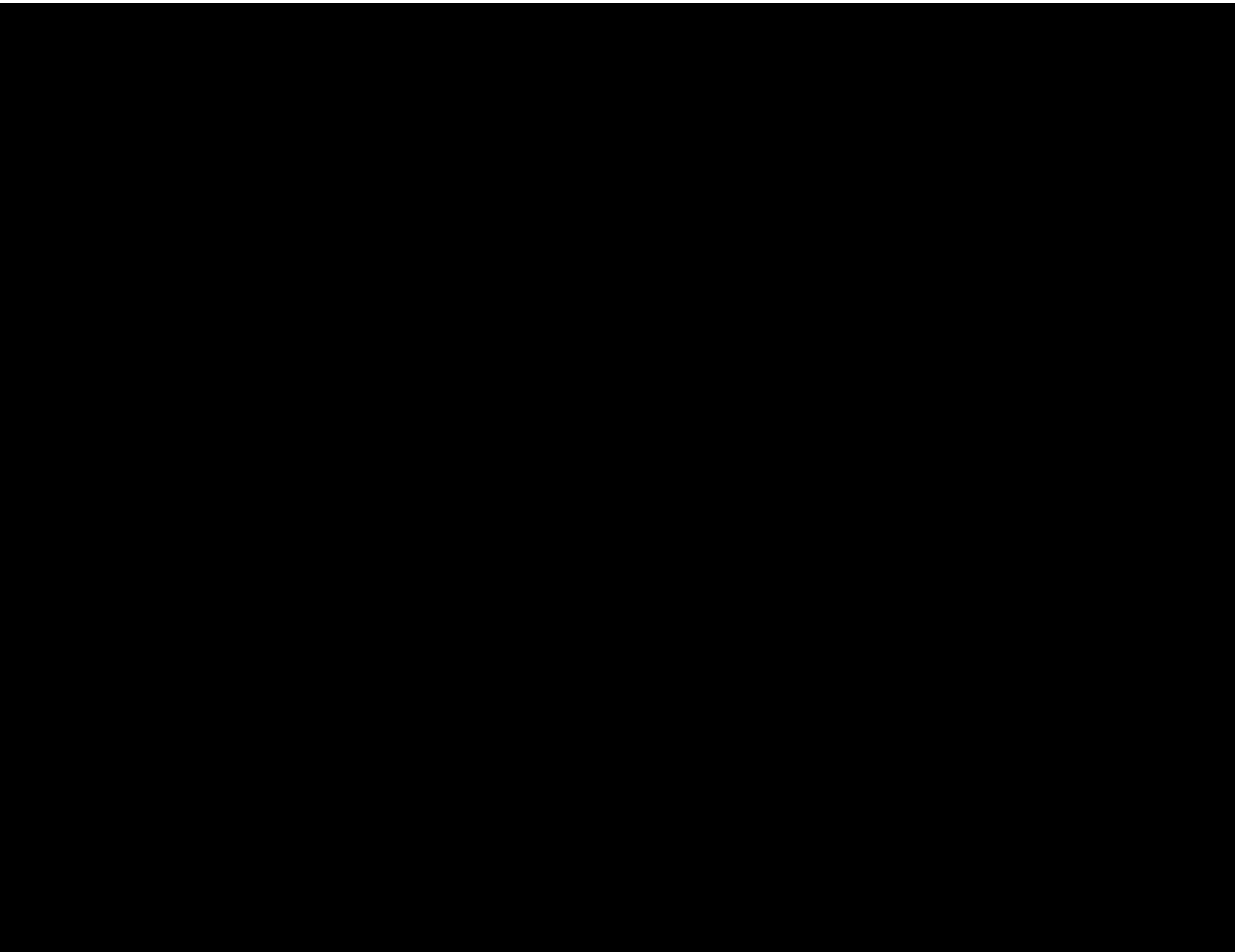

Restoration Chronosequence
0
5
0
5
0
5
0
5
0
*
Pre-
Treatmer
Yr. 1
Yr. 3
Yr. 4
Yr. 8
Pristine 1
Pristine 2
Restoration Age

Percent of total captures

	Pre-Treatment	Restoration Yr. 1	Restoration Yr. 3	Restoration Yr. 4	Restoration Yr. 8 *	Pristine 1	Pristine 2
Mouse *cus boylii*	-	33.3%	-	-	25.0%	5.7%	-
Mouse *cus eremicus*	-	-	-	-	-	17.1%	21.9%
nia Mouse *cus californicus*	-	-	-	-	25.0%	60.0%	59.4%
nia Pocket Mouse *ous californicus*	-	-	-	5.3%	-	2.9%	-
n Harvest Mouse *ntomys megalotis*	100.0%	33.3%	33.3%	21.1%	-	2.9%	6.3%
nia vole *alifornicus*	-	33.3%	66.7%	33.3%	-	5.7%	-
Woodrat *lepida*	-	-	-	-	-	2.9%	
footed Woodrat *fuscipes*	-	-	-	-	-	2.9%	12.5%
wn Woodrat *spp.*	-	-	-	-	50.0%		

nt of total captures

ration 4 grid was only open one night



Restoration Standards

- Plant structural data from 54 stands of CSS at Starr Ranch

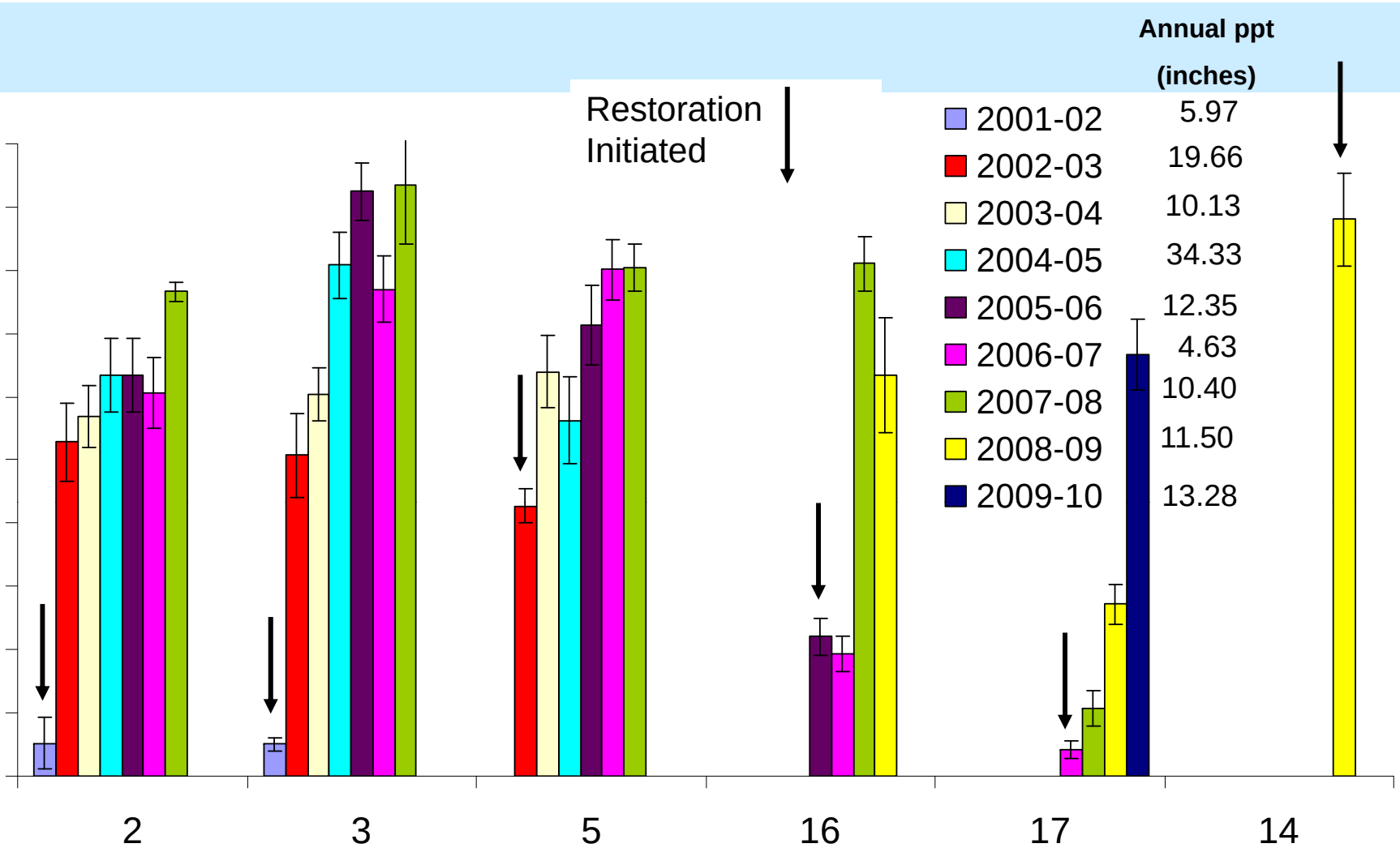
- Small mammal and bird sampling - spring & summer, 2004

Semiarid ecosystems:

- **high temporal variability in abiotic factors**
- **restoration may be more effective during wet years**

Bakker et al. 2003. Ecological Applications 13

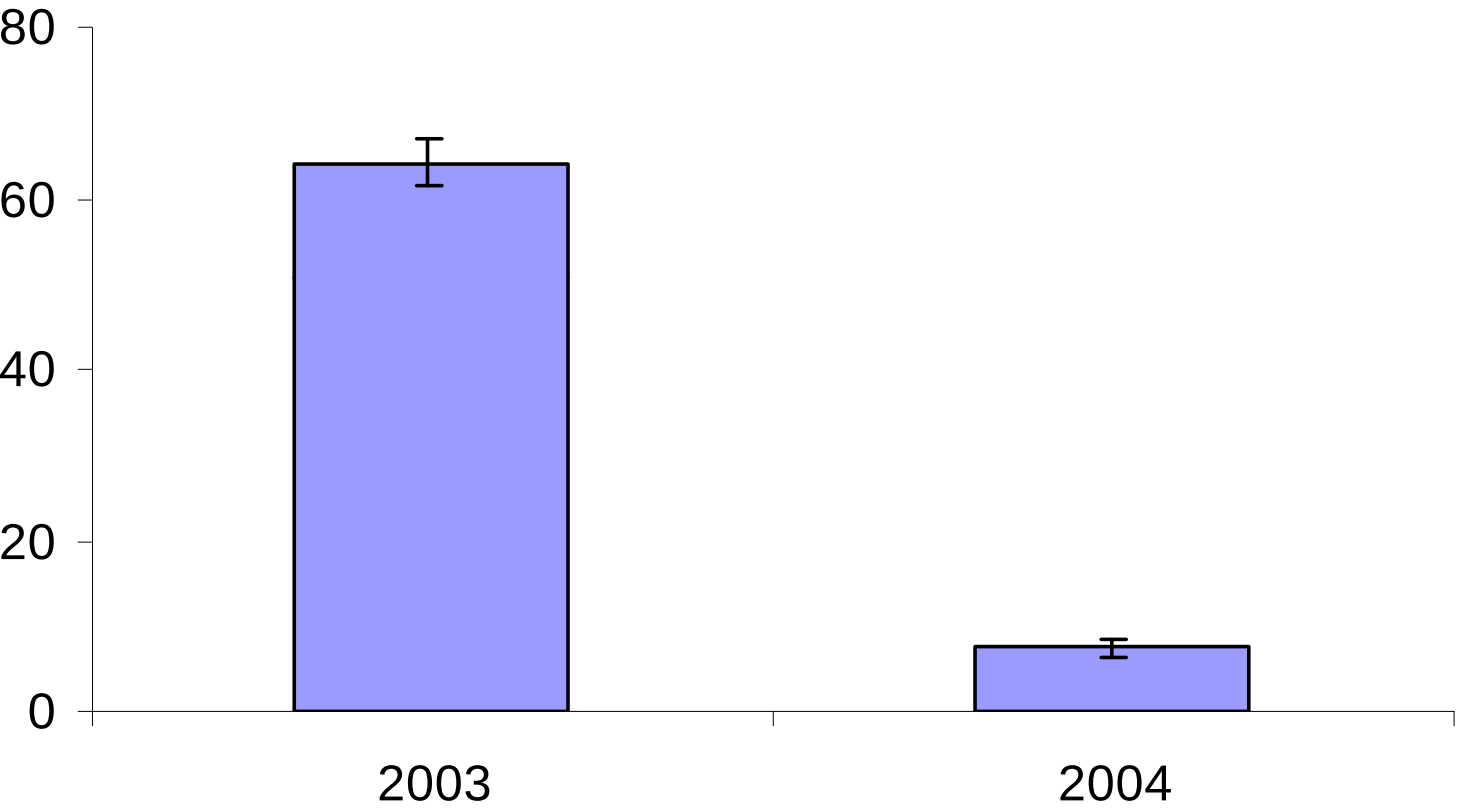
Cox and Allen. 2008. Journal of Applied Ecology 45



Baseline cover CYNCAR: 40 – 90%

Baseline native cover: 0 – 5%

Gr. 5 ARTCAL End Season Planted Plug Height



n = 20
Survivorship = 100%

n = 20
Survivorship = 60%