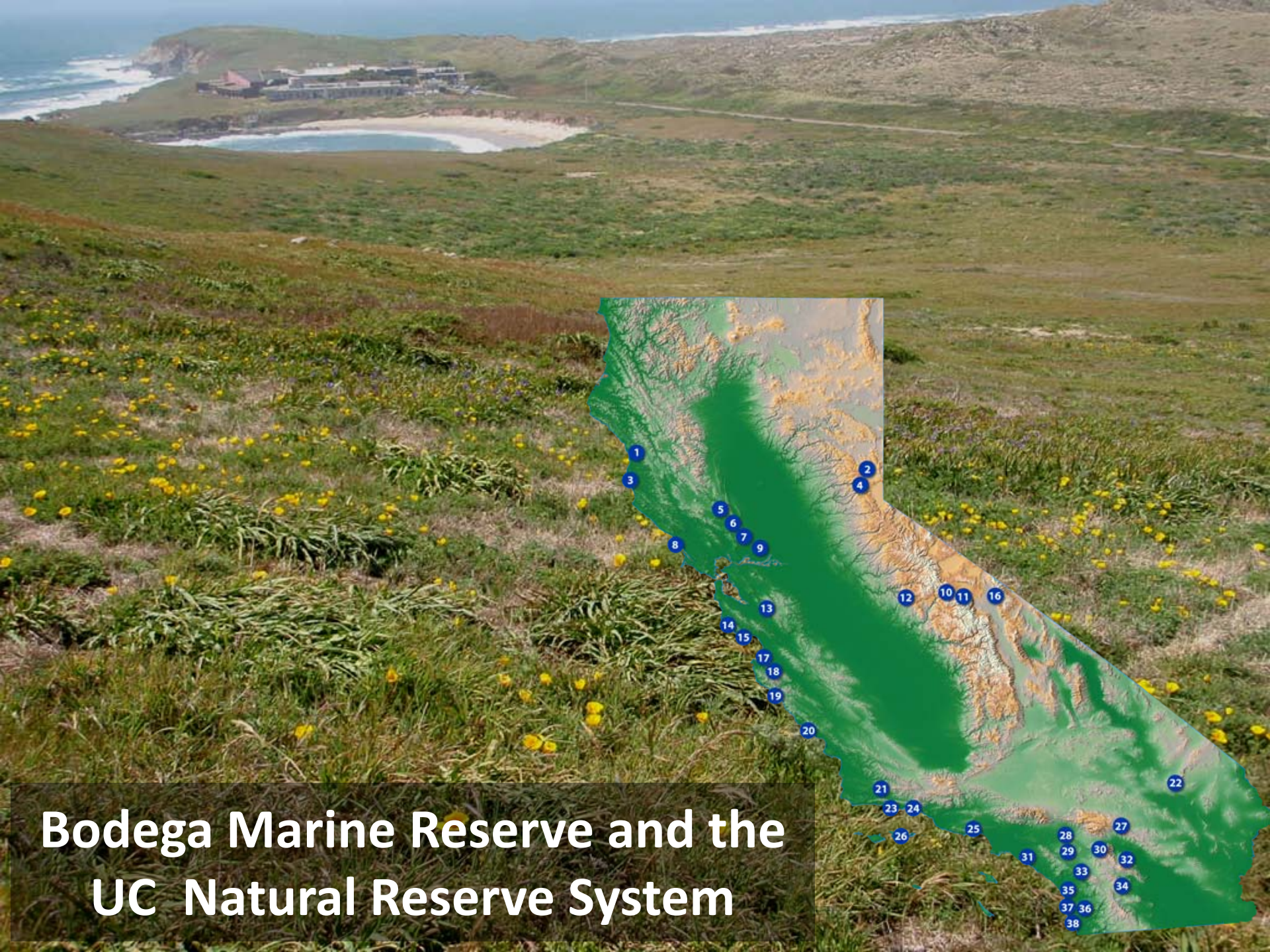
Selective Management of Velvet Grass in Coastal Prairie Restoration

Lewis Reed and Suzanne Olyarnik

Bodega Marine Reserve

UC Davis



Bodega Marine Reserve and the UC Natural Reserve System

Coastal Prairie: Distribution

Costal Prairie: Diversity

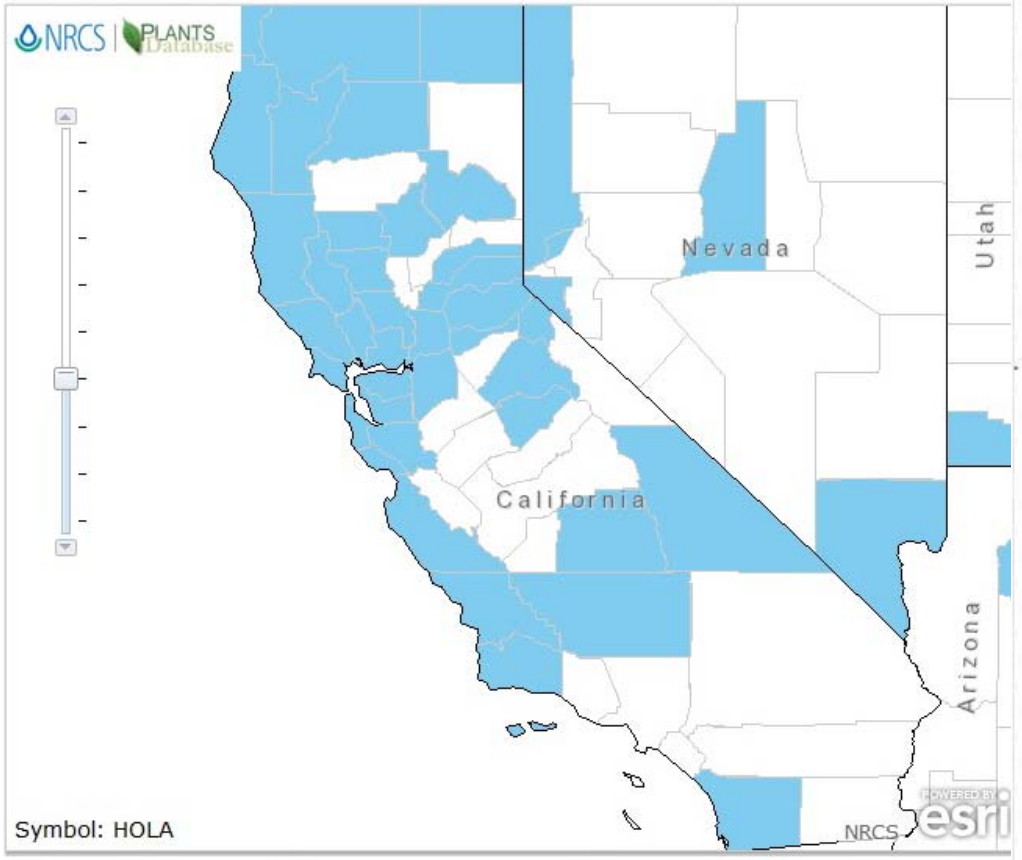
Coastal Prairie: Diversity

~ 90% of species in CA inventory of rare and endangered species occur in grasslands

Ecosystem Goods and Services

Threats and challenges in restoration

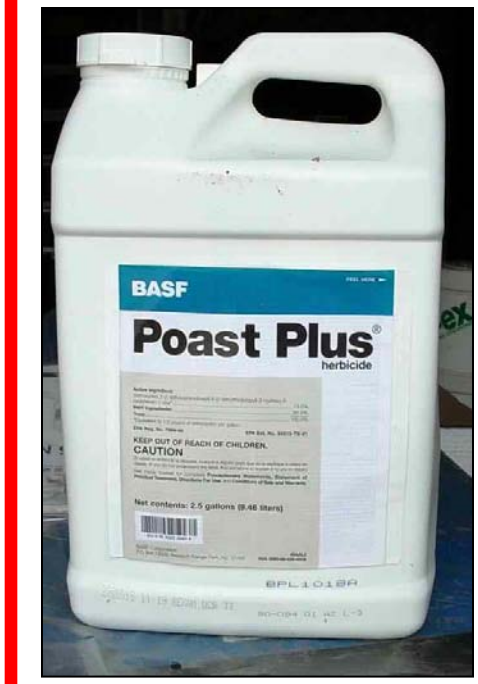
Distribution of *H. lanatus* and Coastal Prairie in CA

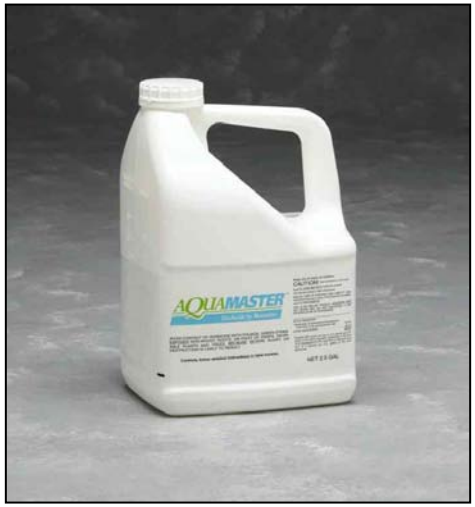


H. lanatus

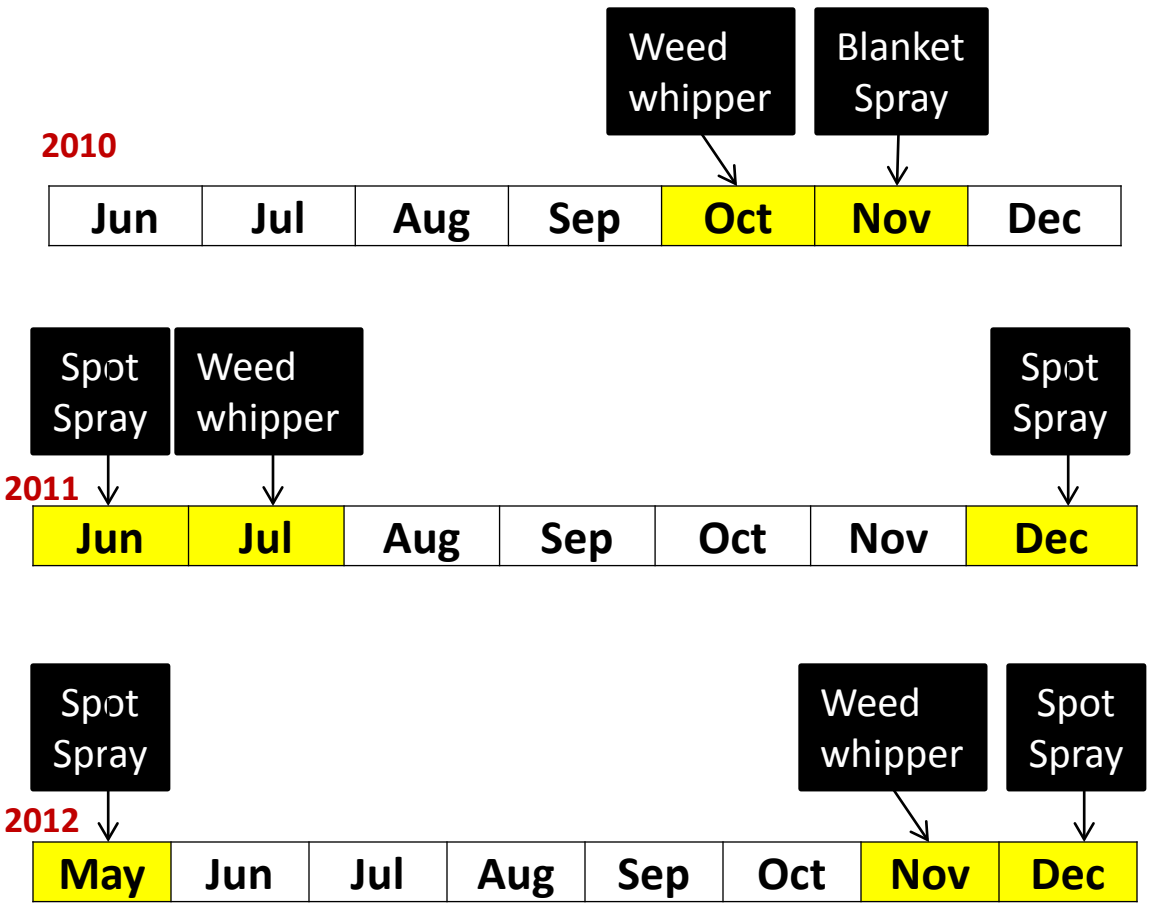
Coastal Prairie

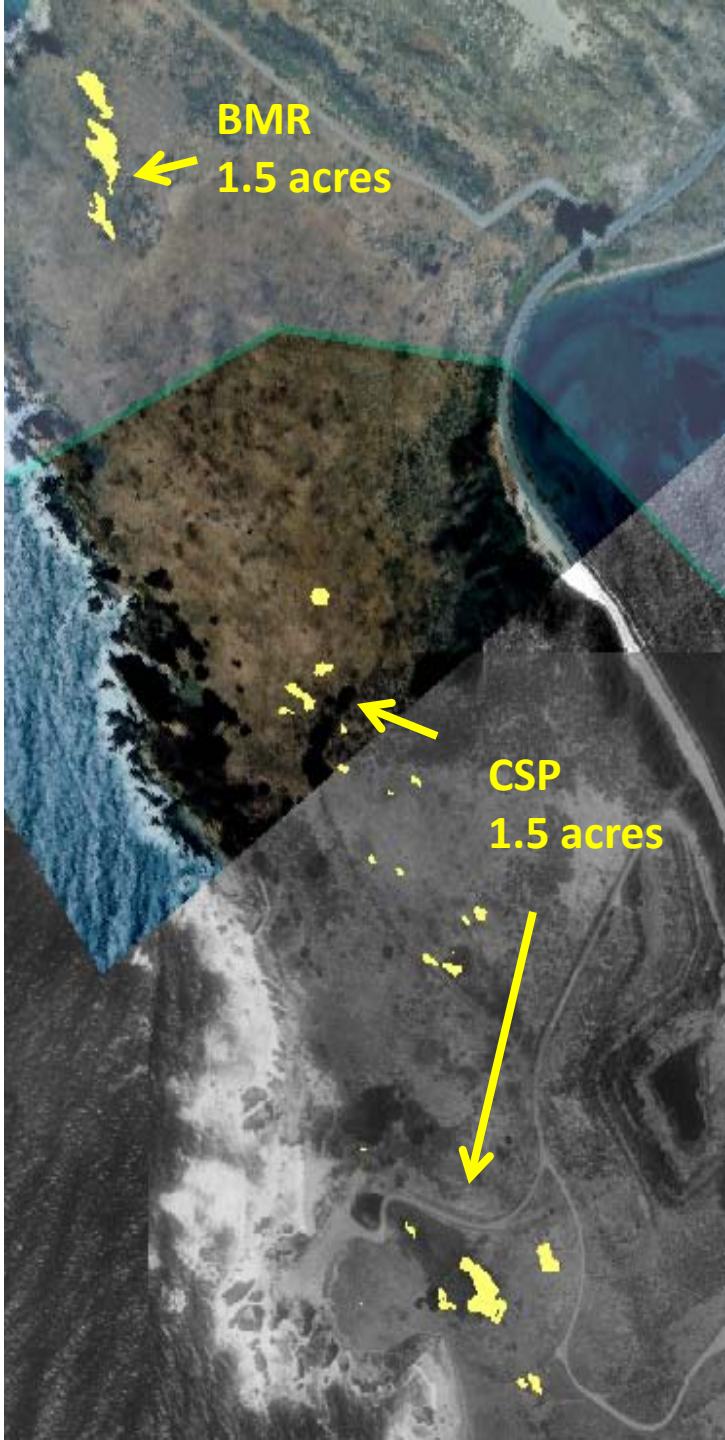
Management Methods (Treatments)





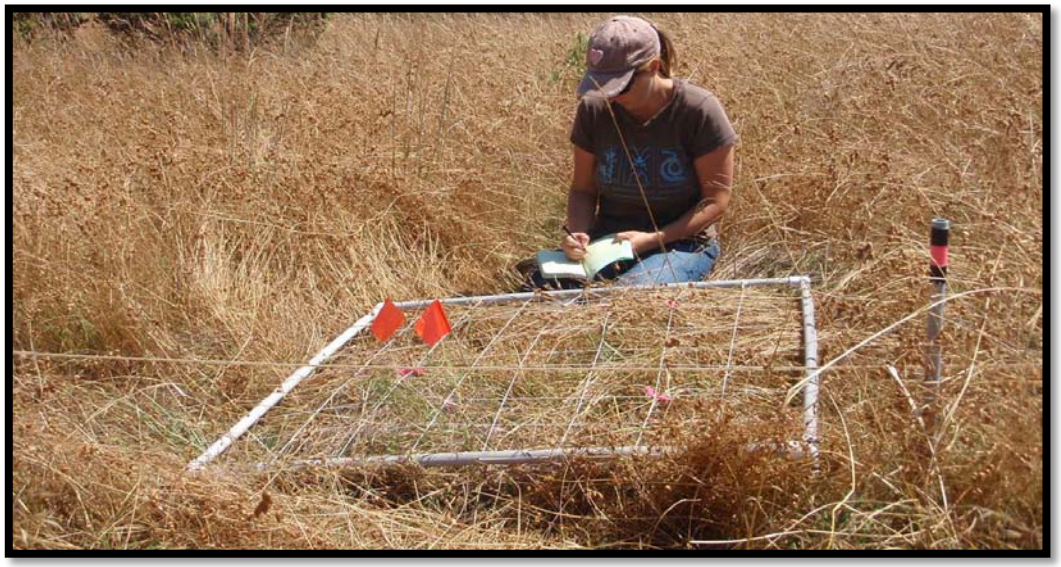
Herbicide Treatment
Bodega Marine Reserve and State Parks





Monitoring Methods

- Baseline data 2010, annual spring monitoring 2011–2013
- Permanent, marked transects
  - (same transects sampled)
- Multiple quadrats per transect
  - unit of replication is transect



Thanks to Michelle Cooper, Tawny Mata, Jackie Sones, and Kathleen Kraft for monitoring help.

Monitoring Methods

Sample 1m x 1m quadrats:

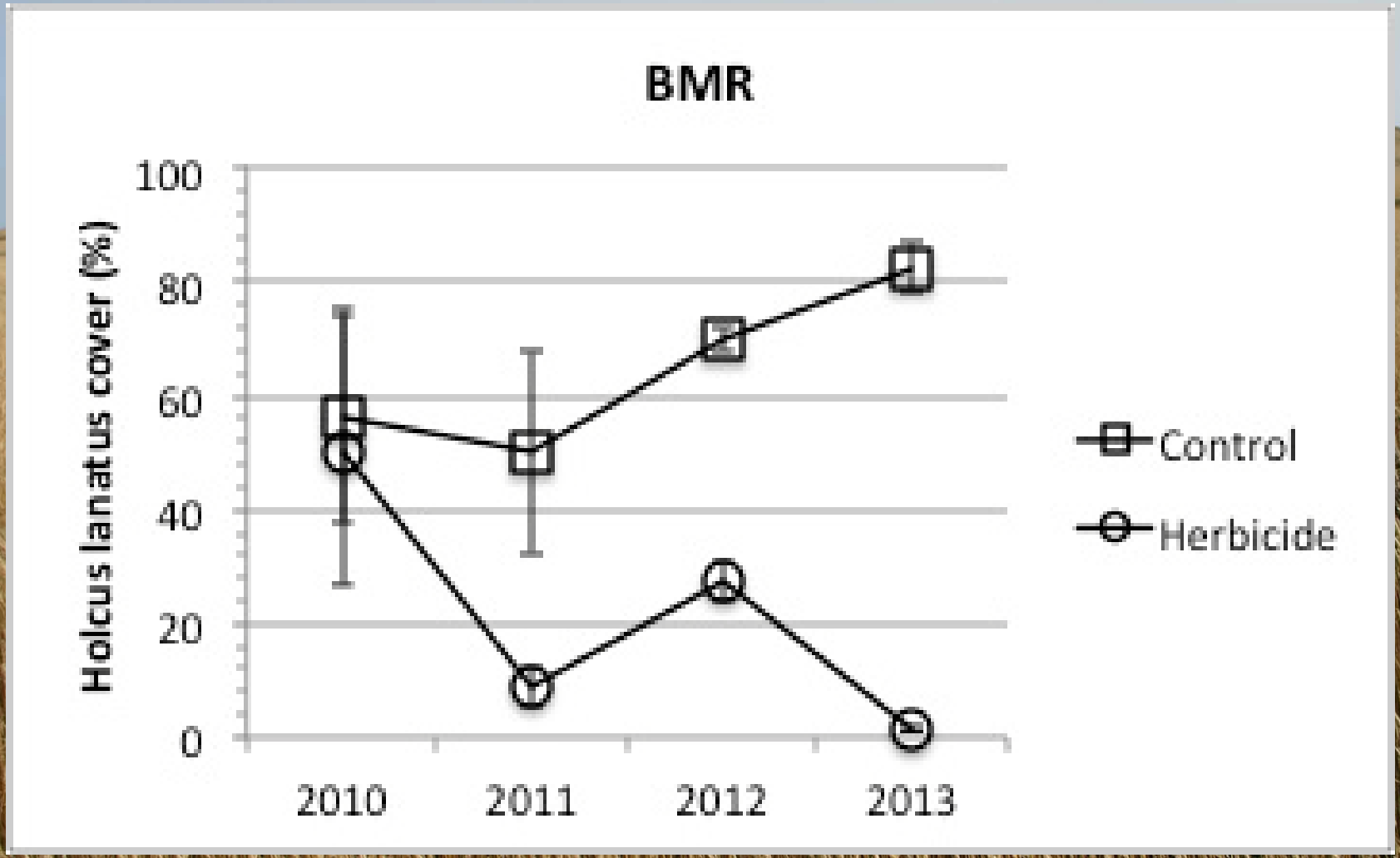
1. *Holcus* frequency:
   - Probability of finding a species in a particular area
   - Sensitive to change
   - Only appropriate for comparing change in one species
2. *Holcus* cover (%)

(Daubenmire cover classes)

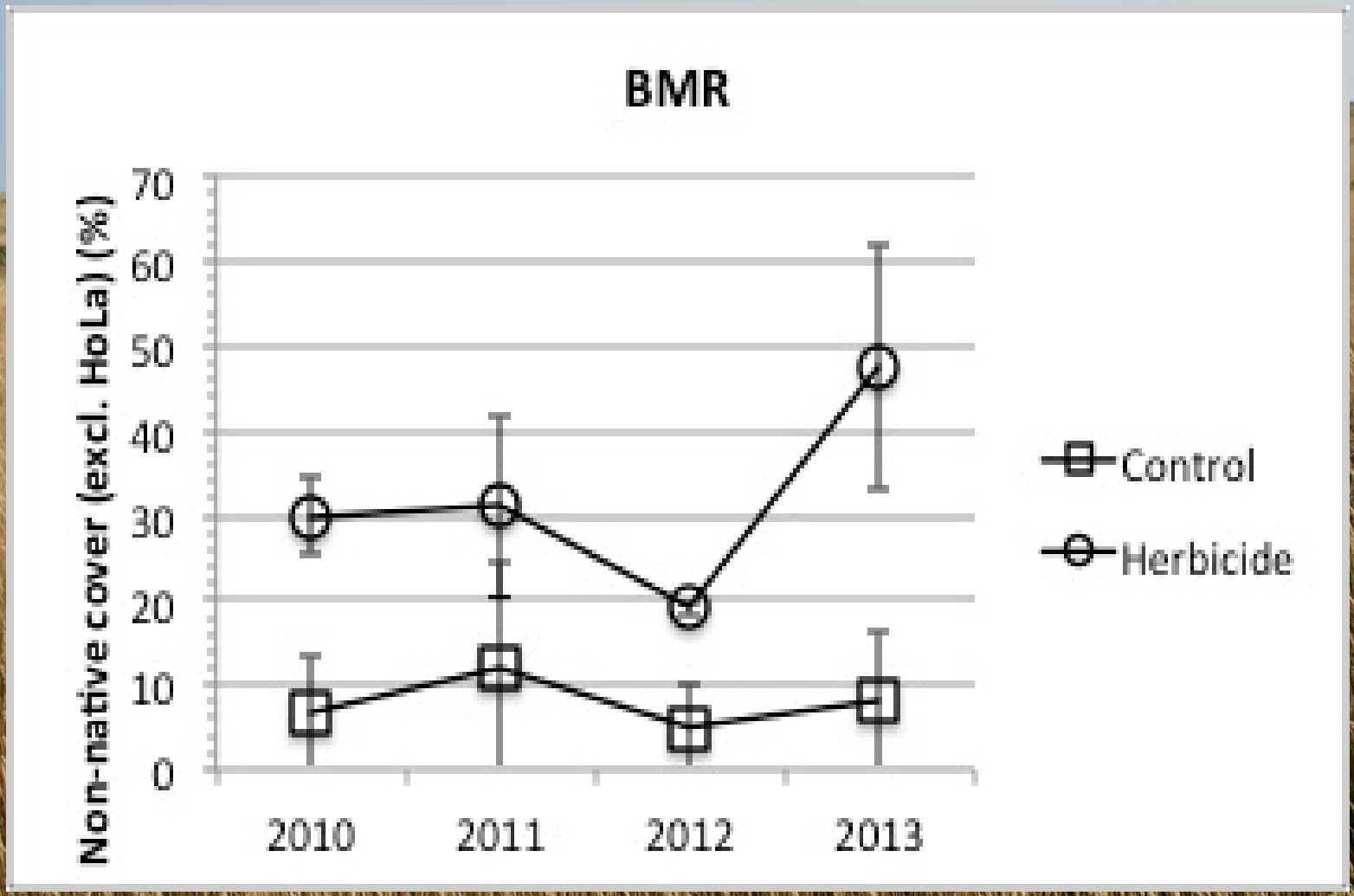
   - Most common attribute measured
   - Expresses dominance
   - Can compare across species

3. ID and cover of all other species, thatch & bare ground

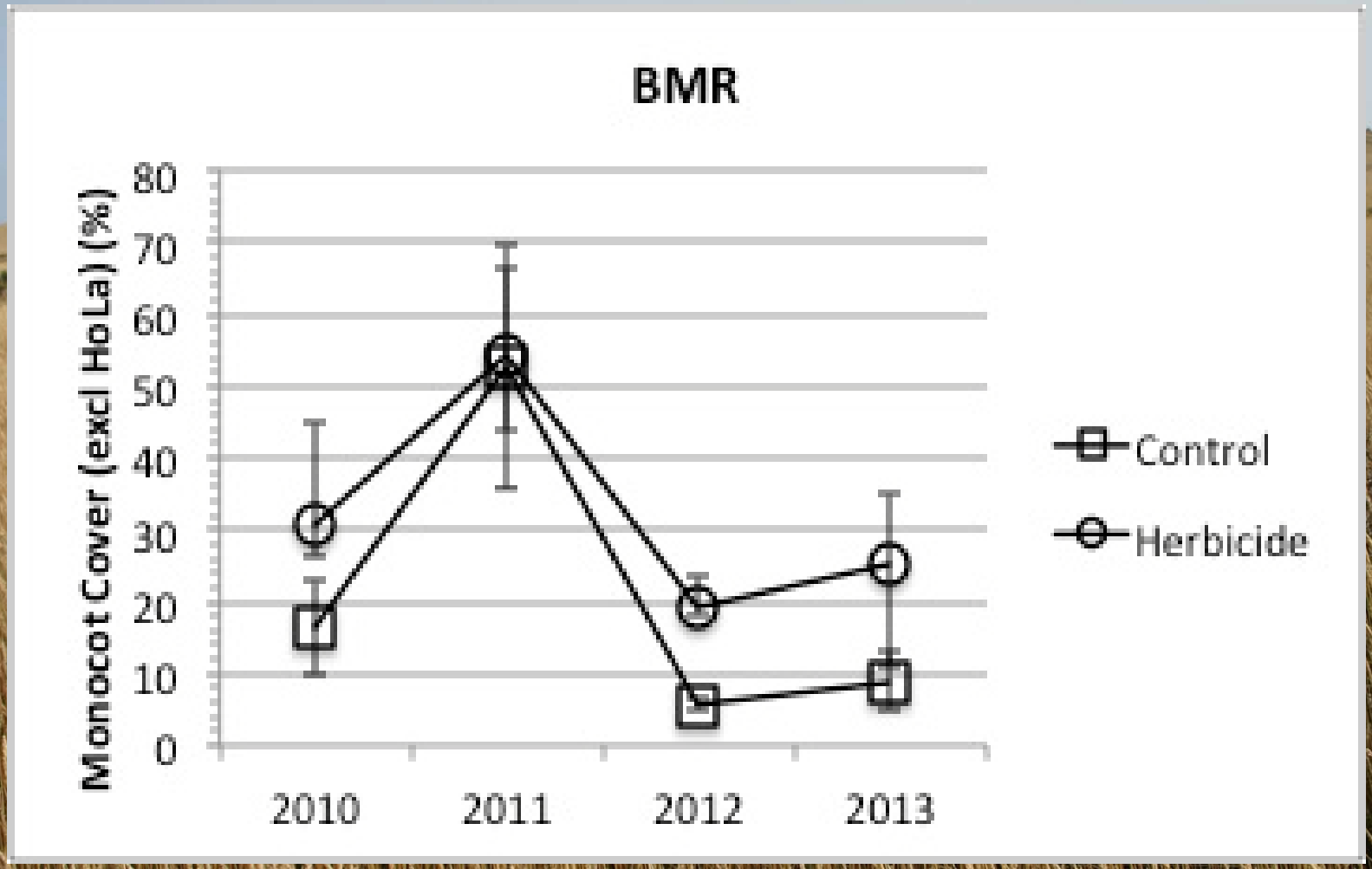
Results:


BMR
Holcus lanatus cover (%)
100
80
60
40
20
0
2010
2011
2012
2013
Control
Herbicide

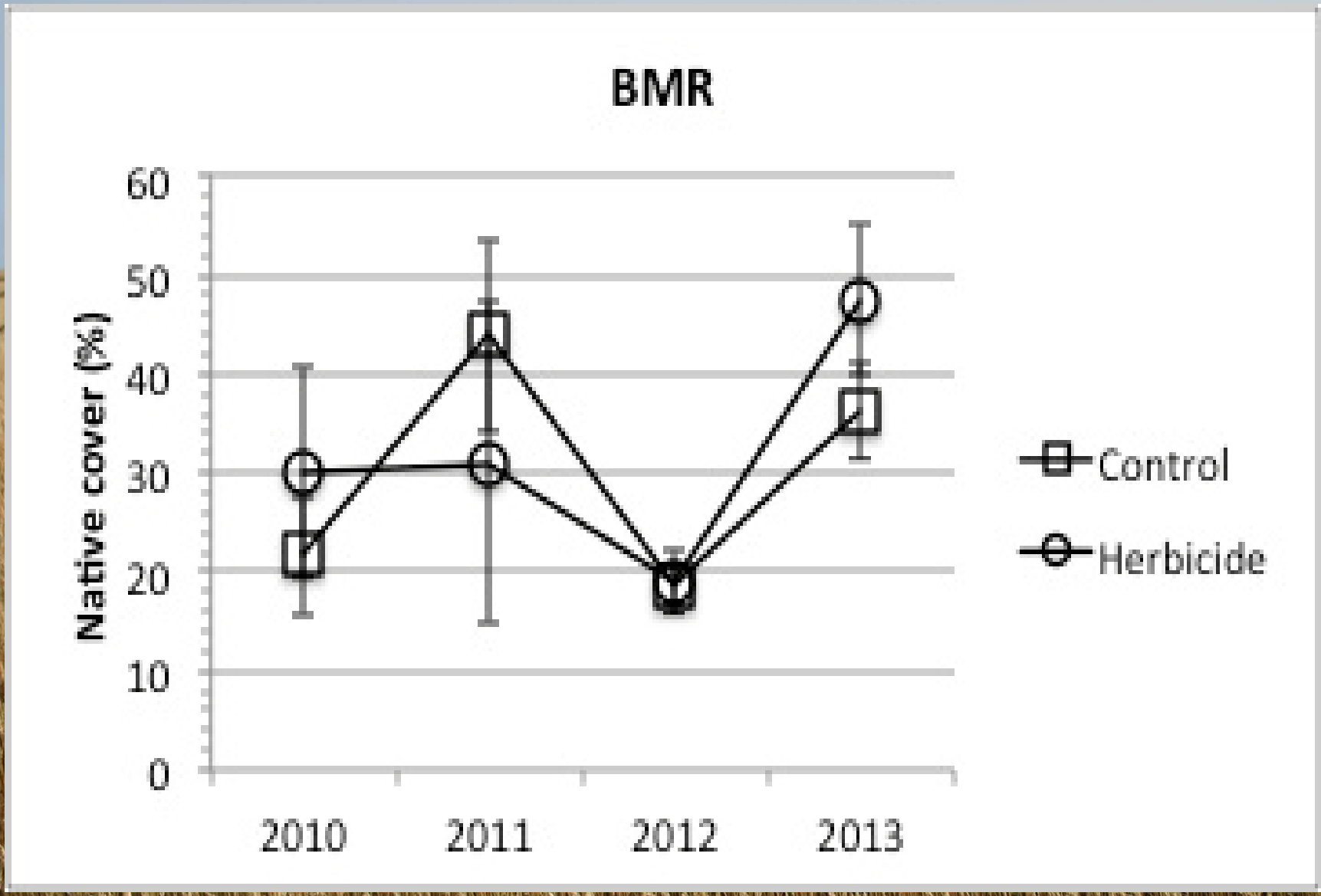
Results:


BMR
Non-native cover (excl. HoLa) (%)
70
60
50
40
30
20
10
0
2010
2011
2012
2013
Control
Herbicide

Results:


BMR
Monocot Cover (excl HoLa) (%)
80
70
60
50
40
30
20
10
0
2010
2011
2012
2013
Control
Herbicide

Results:


BMR
Native cover (%)
60
50
40
30
20
10
0
2010
2011
2012
2013
Control
Herbicide

Fritillaria affinis

Conclusions

- Effective reduction in *H. lanatus* frequency & cover
- Follow-up / maintenance required
  - Remaining H. lanatus
  - Other invaders that respond positively
- Selective based on differences in key functional traits.
  - many natives responded positively including some grasses

Coastal Prairie Restoration at BMR and Beyond

Thank you to our project sites & managers:

Ocean Song Farm and Wilderness Center

California State Parks

Bodega Pastures

Sonoma Land Trust

Occidental Arts and Ecology Center

Thank You!

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Reserve Steward
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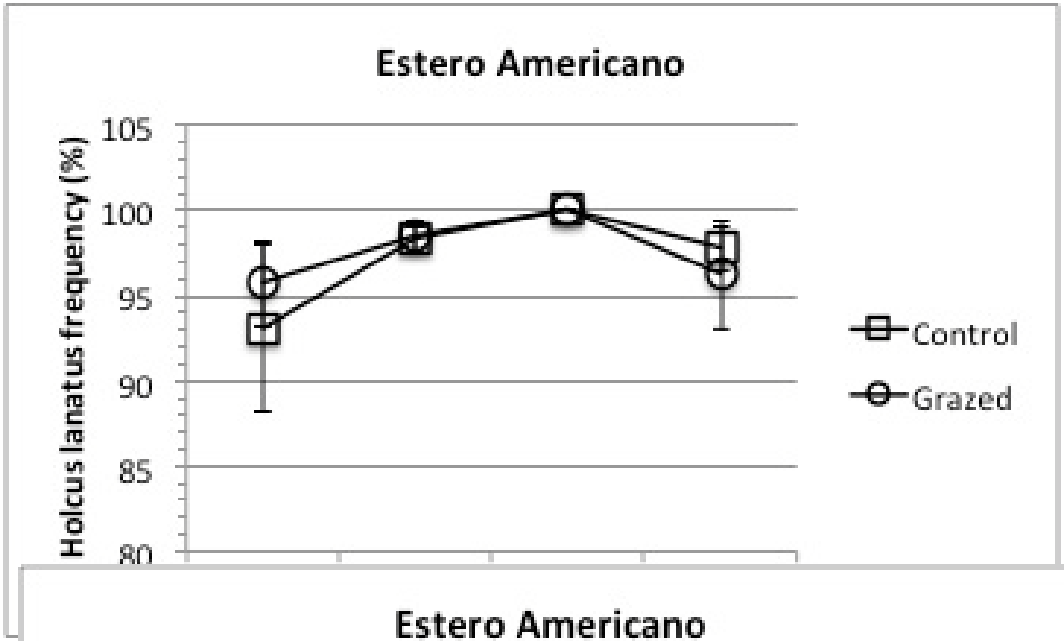
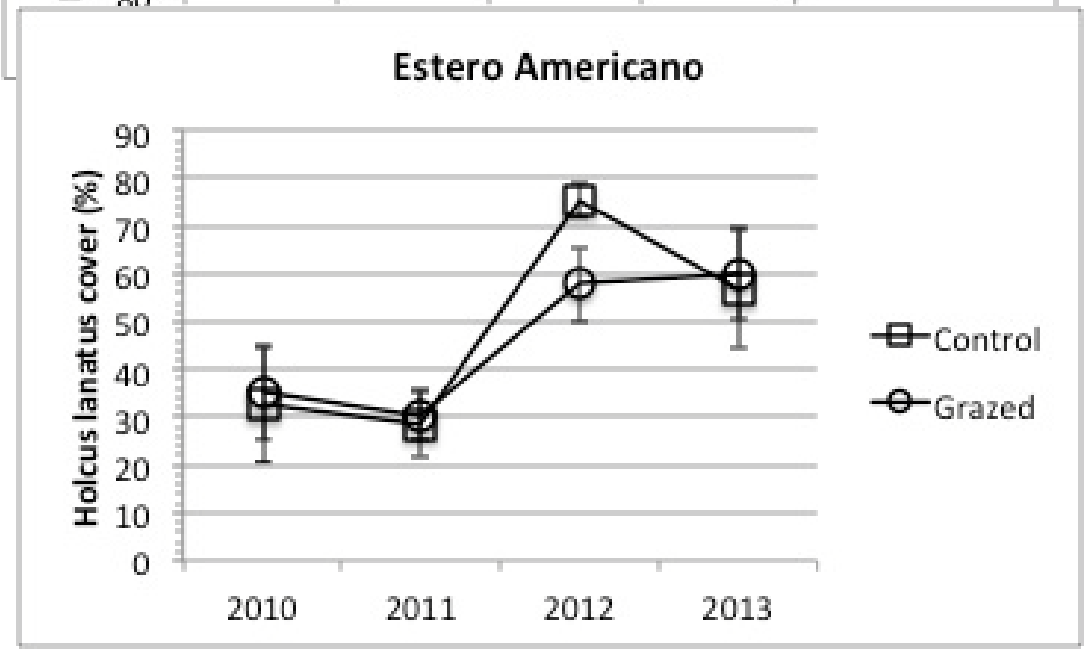
CATTLE GRAZING:
Estero Americano (Sonoma Land Trust)

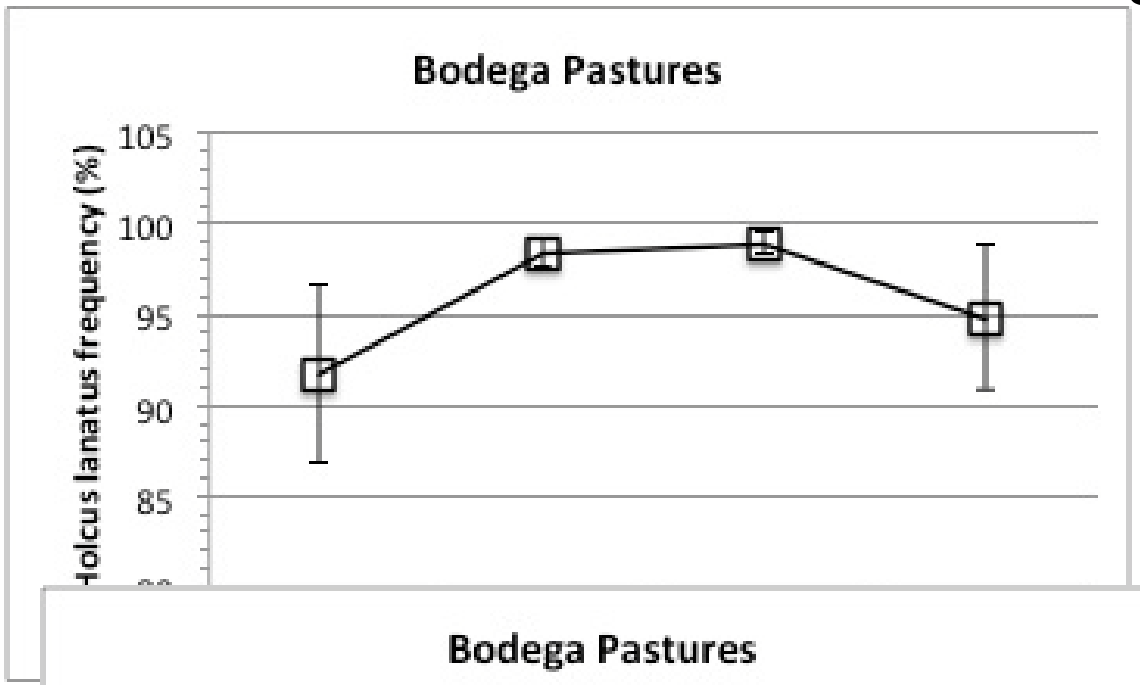


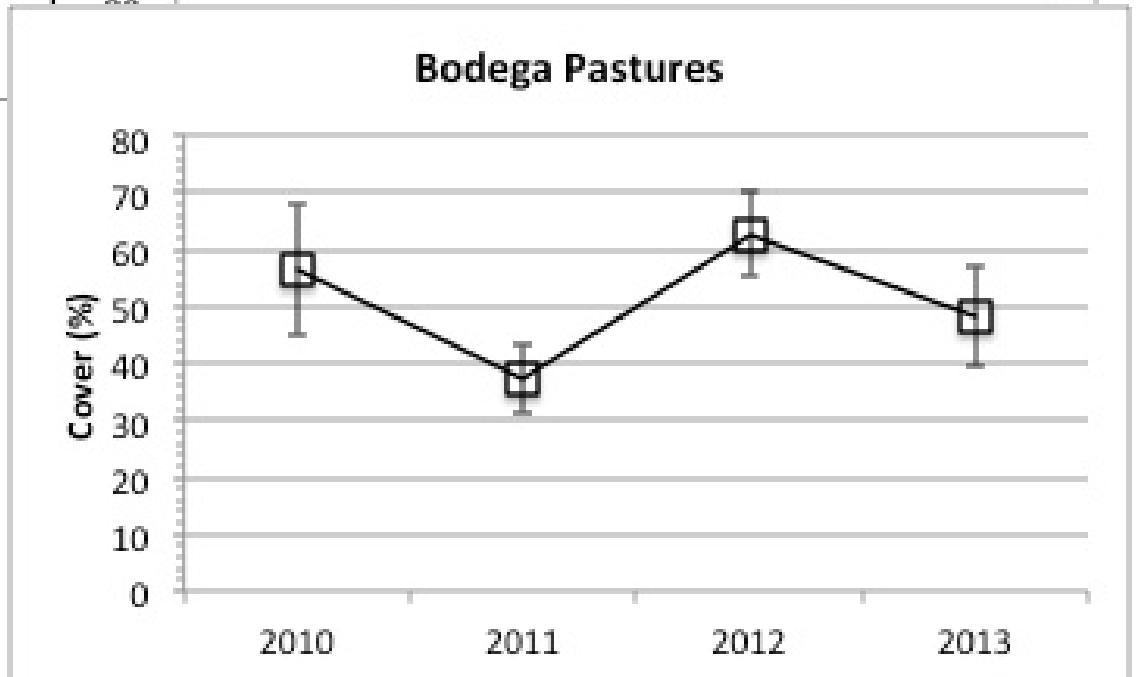


Results:

- *Holcus* frequency started high, remained high
- *Holcus* cover increasing over time (more than 2X)
- No significant difference in increase in *Holcus* between grazed & control plots

SHEEP GRAZING: Bodega Pastures



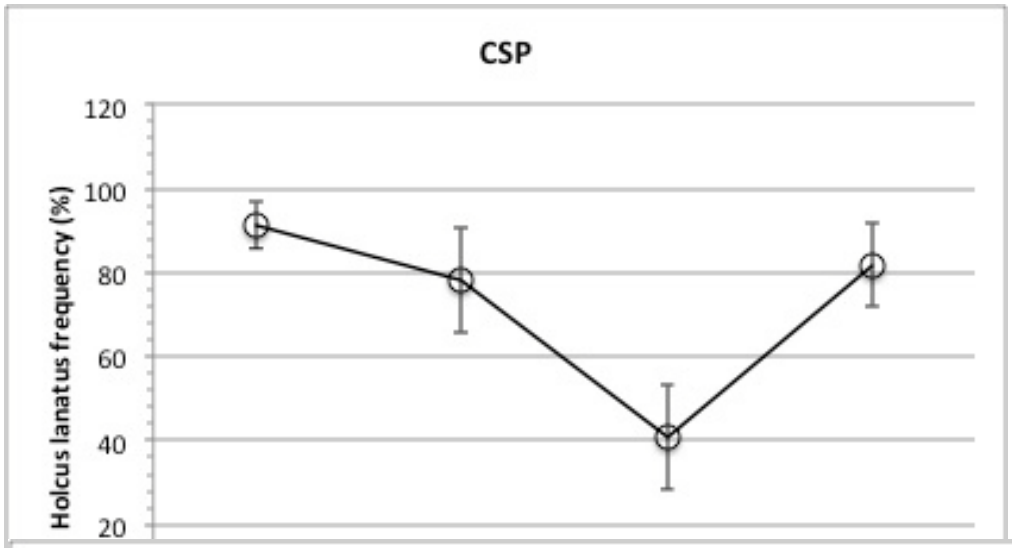


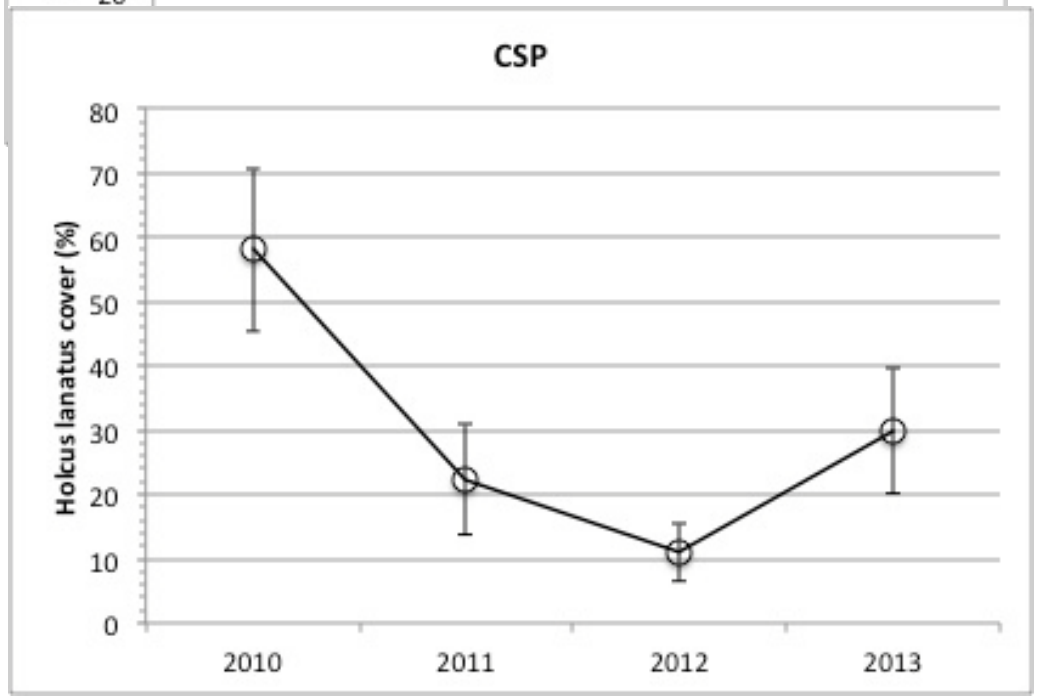
Results:

- Frequency: started high, remained high
- Cover: started high, varied over time, did not increase above baseline

  → Holding the line

Non-Selective HERBICIDE: CSP

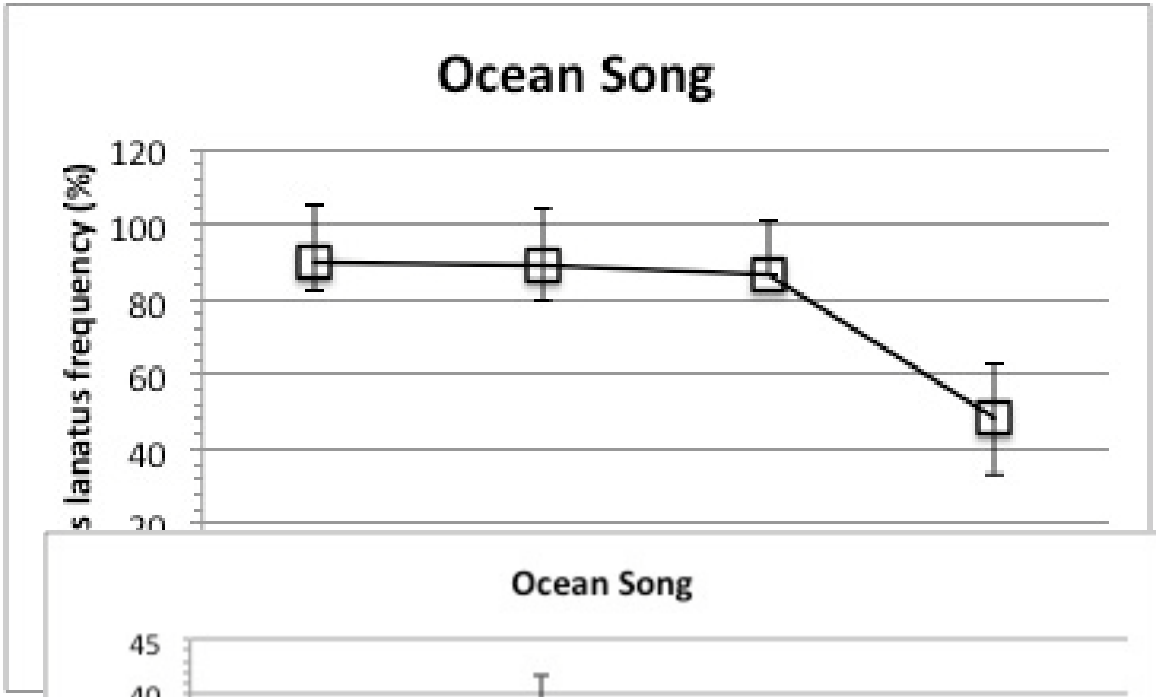


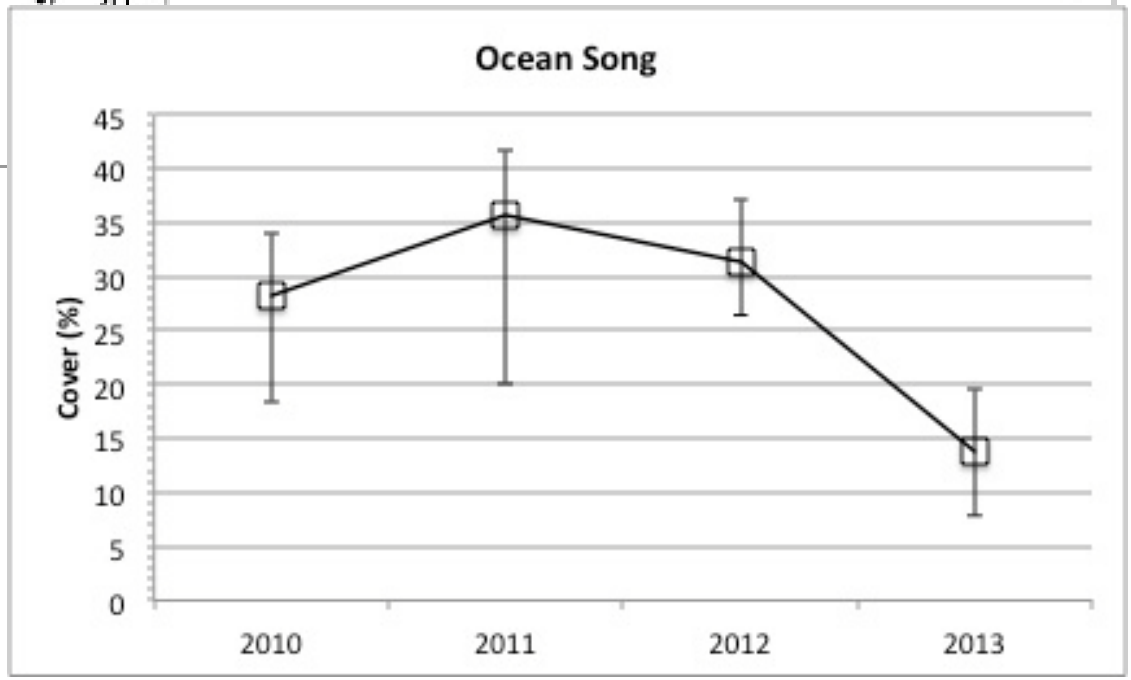


Results:

- Frequency decreased but rebounded
- Cover decreased below baseline, increased in 2013.

MOWING: Ocean Song Farm & Wilderness Center

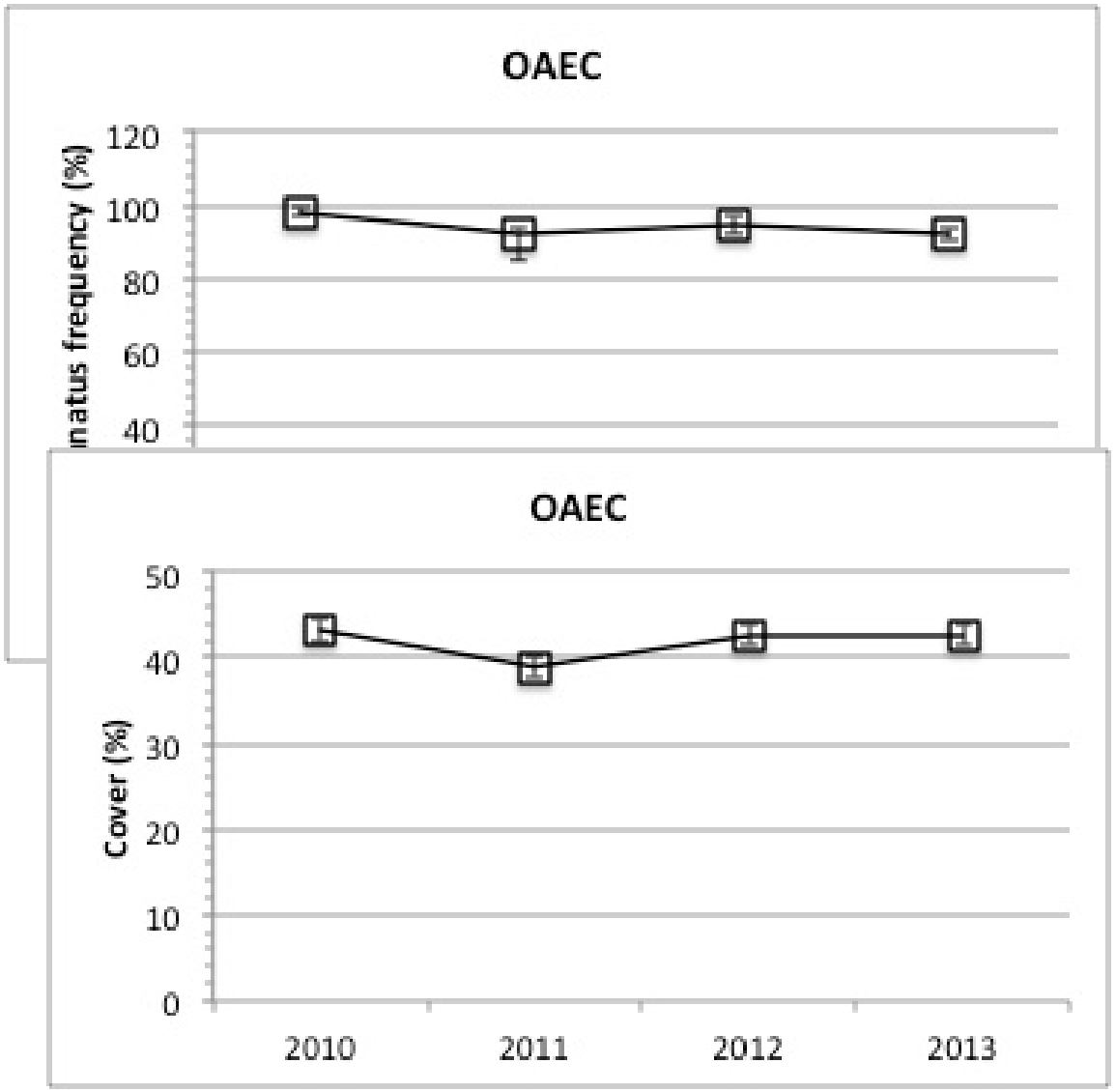




Results

- Frequency high, no change over time until 2013
- Cover relatively low, no decrease until 2013

MOWING & Late Season RAKING: Occidental Arts & Ecology Center



Results:

- No decrease in frequency or cover
- Additional raking effort did not reduce *Holcus*