

Out of the frying pan: Invasion of exotic perennial grasses in coastal prairies

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Exotic annuals

Exotic annual grasslands

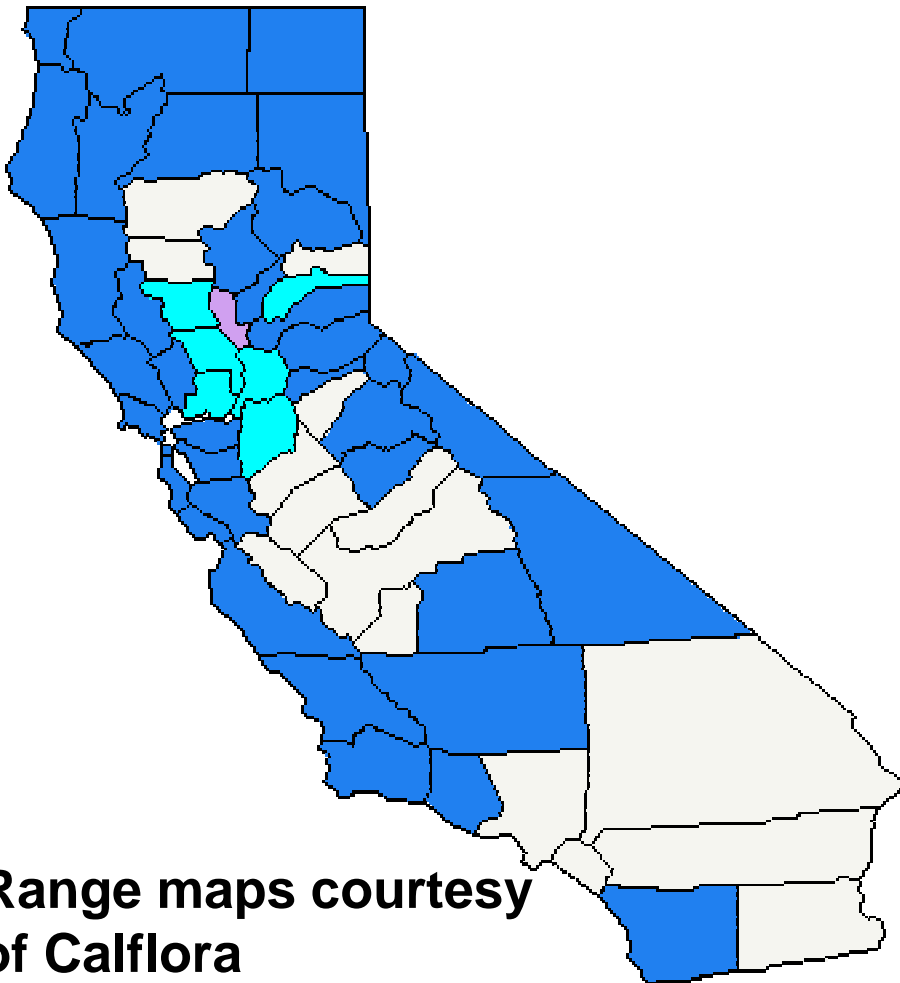


**Exotic perennial
grasses:
An even greater threat?**



Holcus lanatus

Velvet grass

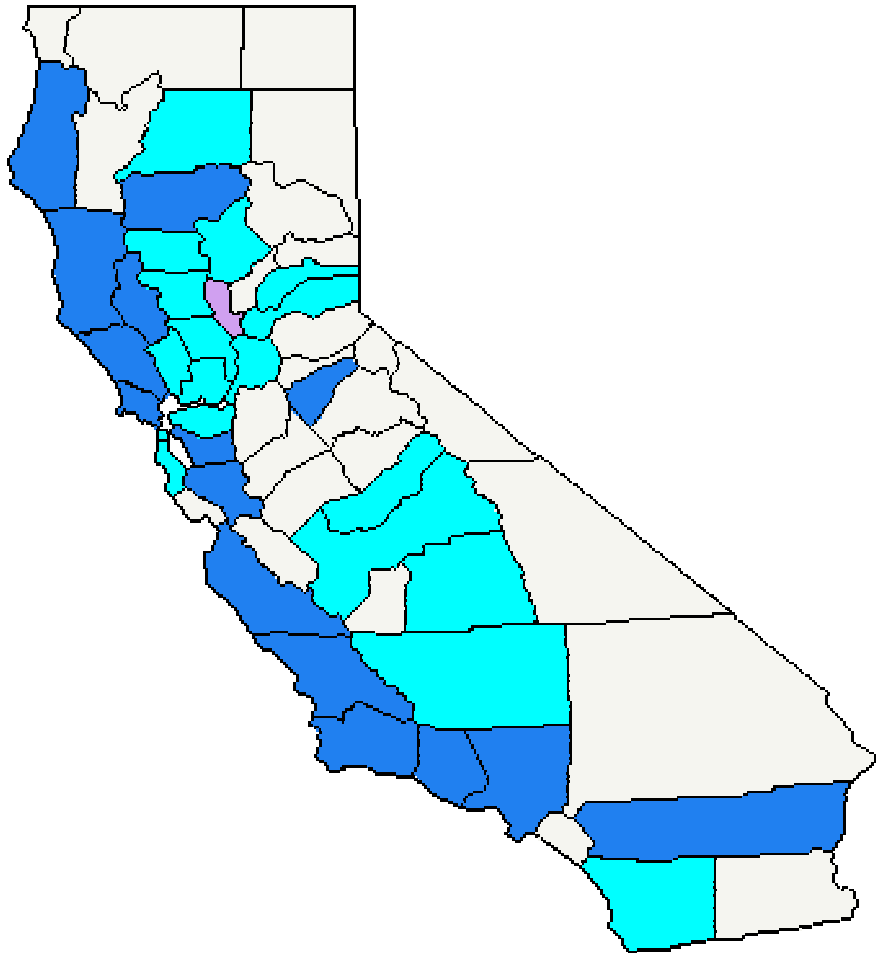


Range maps courtesy of Calflora

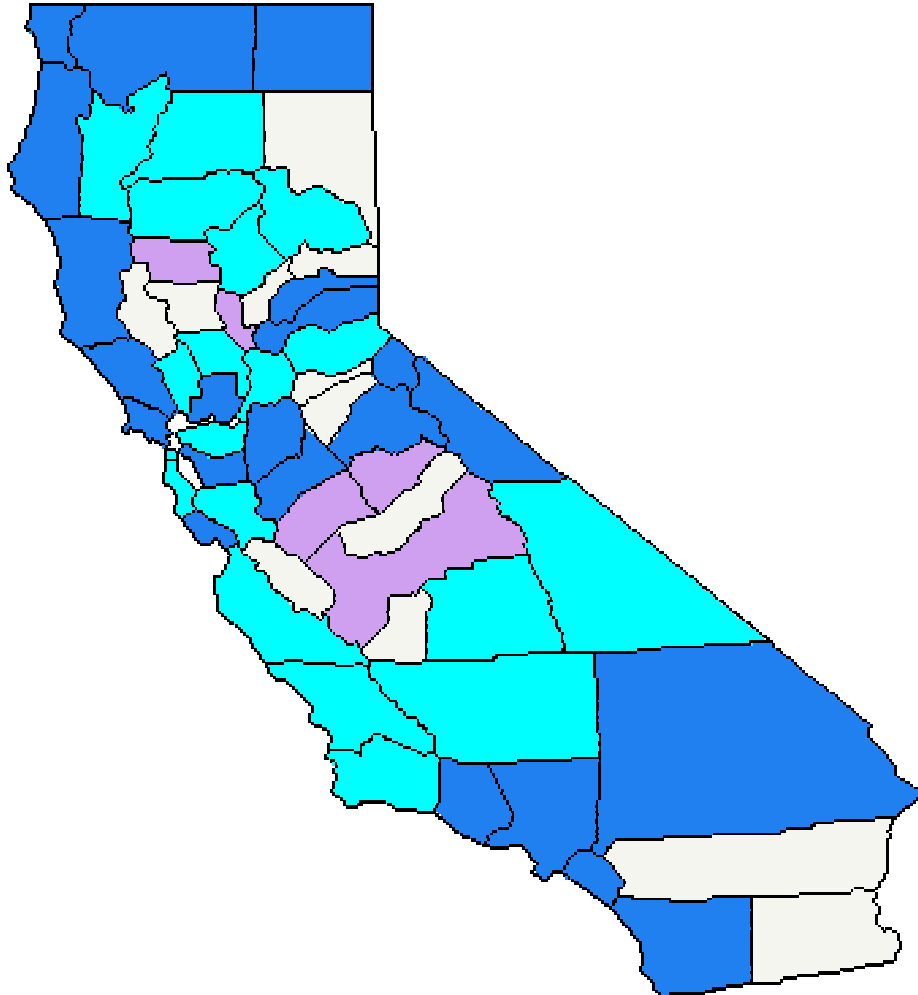


Phalaris aquatica

Harding grass



Dactylis glomerata
Orchard grass



Cal-IPC Categories

List A: “Most aggressive invaders that displace natives and disrupt natural habitats”

List B: “Invaders that spread less rapidly and cause a lesser degree of habitat disruption”

Current classification

- ***Holcus lanatus* – List B**
- ***Festuca arundinacea* – List B**
- ***Phalaris aquatica* – List B**
- ***Dactylis glomerata* – NONE**

Impacts of exotic perennial grasses

- **Ability to invade coastal ecosystems**
- **Ability to displace native species**
- **Challenges for restoration and management**

Invasion

Exotic annual grasslands



Invasion

Coastal scrub

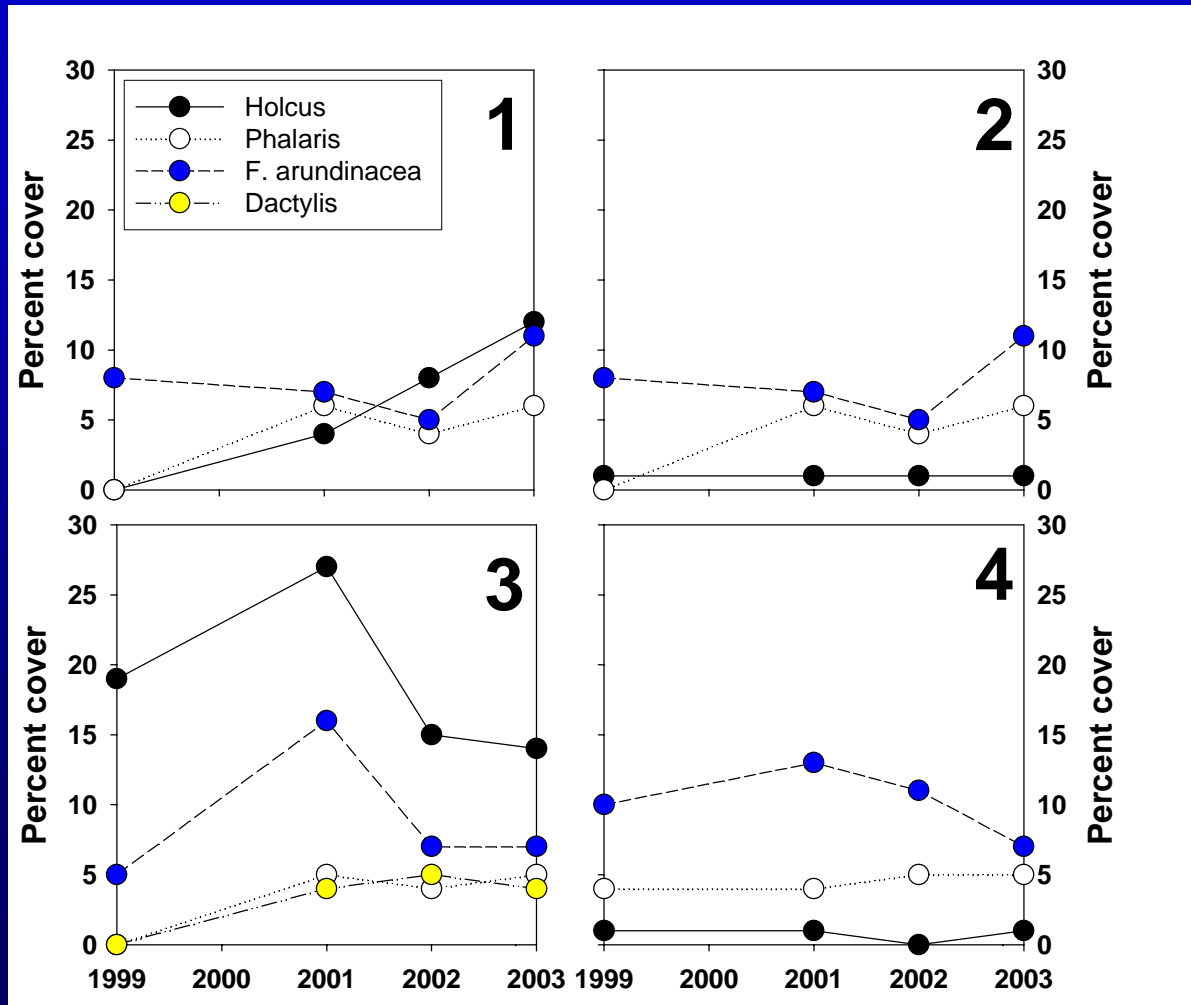


Invasion

Remnant coastal prairies



Percent cover in a native-dominated coastal prairie – Tom's Point Preserve



Invasion

Holcus establishment in coastal prairies: Does species composition matter?



*Bromus
carinatus*



*Festuca
rubra*



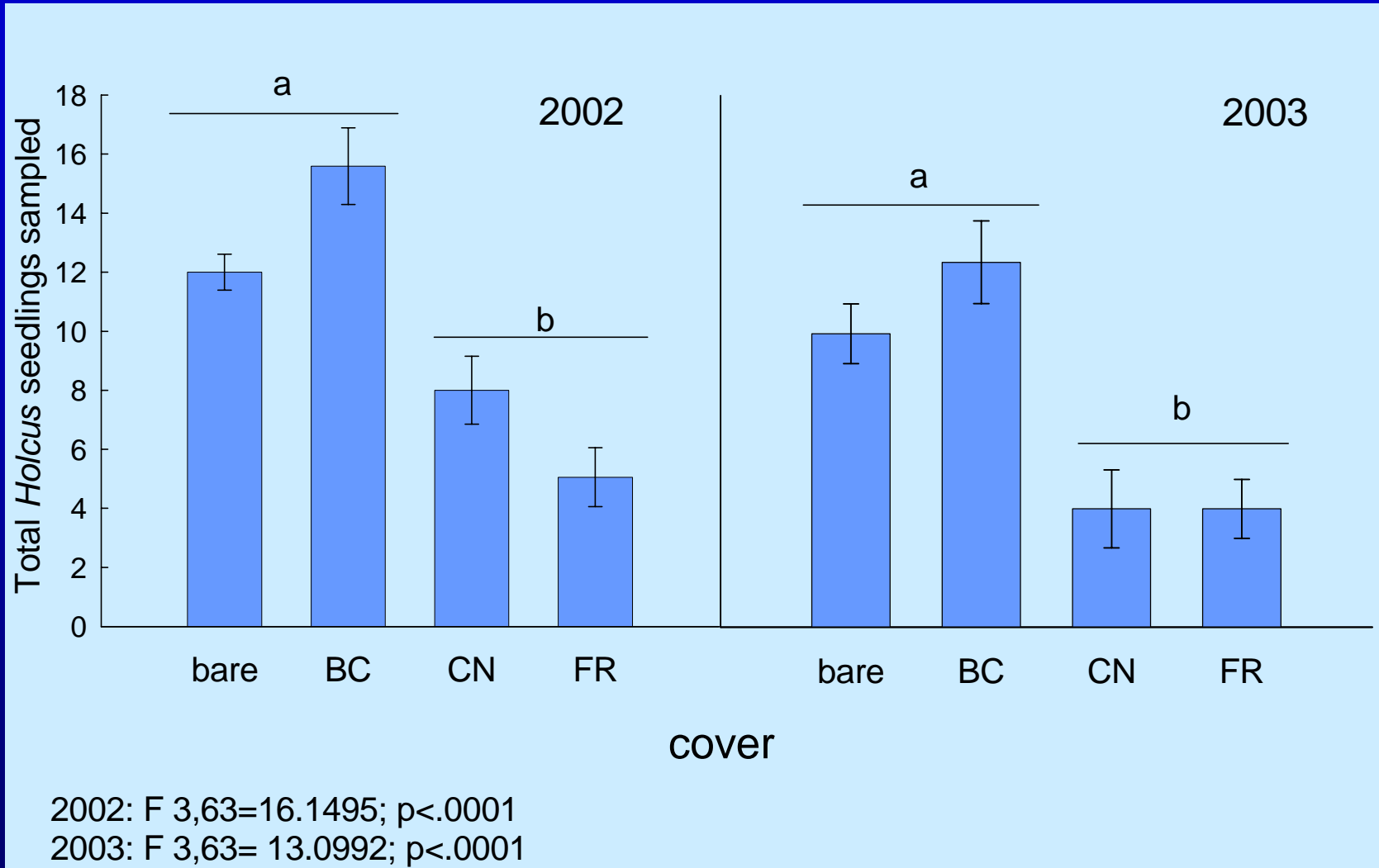
*Calamagrostis
nutkaensis*

(also created bare plots)

Invasion

- **Allowed plants to establish for two years, then invaded with *Holcus* seeds**

Invasion



Ability to invade coastal ecosystems

- **Exotic perennials able to invade a variety of coastal ecosystems**
- **Ability to invade varies with community composition**
- **Disturbed habitats particularly vulnerable**

Impacts of exotic perennial grasses

- Ability to invade coastal ecosystems
- **Ability to displace native species**
- Challenges for restoration and management

Competition Experiment

**Natives
only**

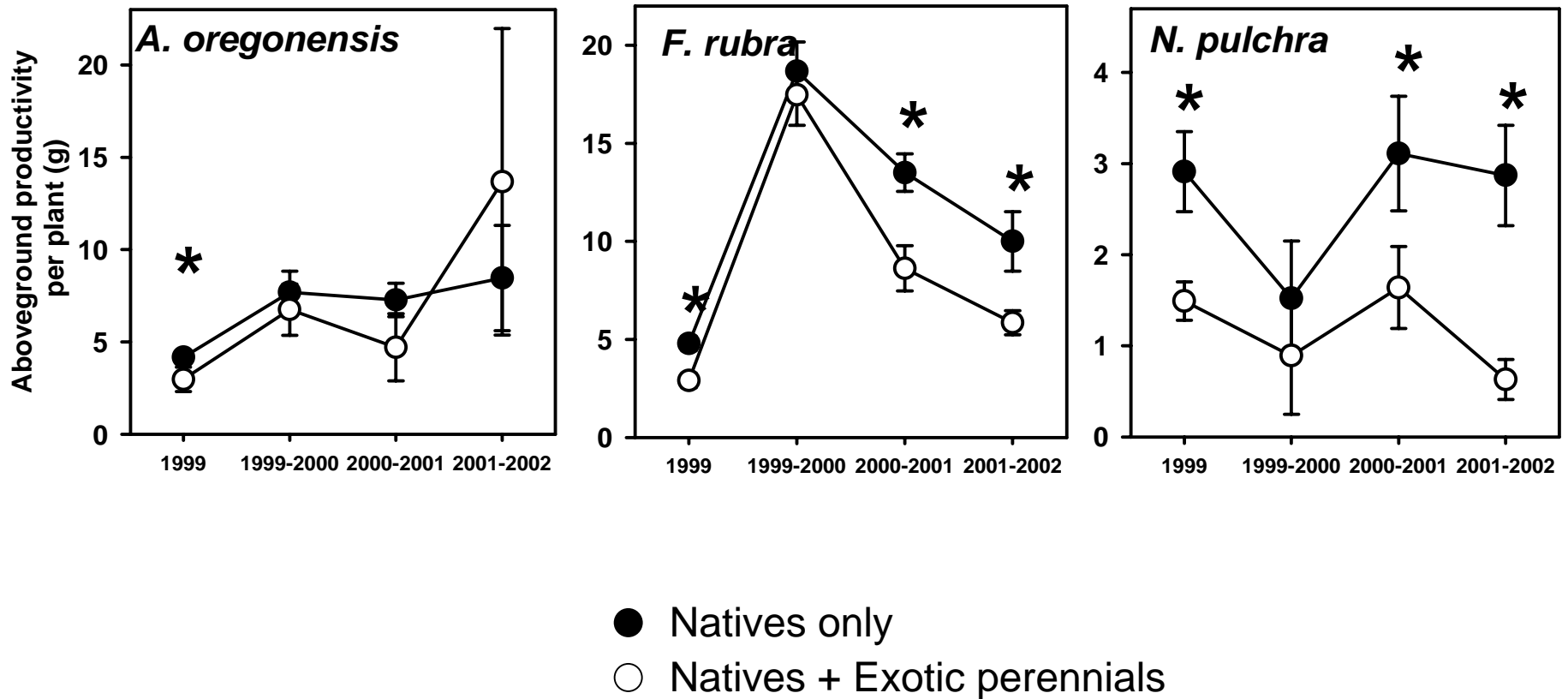
**Natives
+
Exotics**

**Exotics
only**

- **Marin County, CA**
- **1.5 m x 1.5 m plots**
- **Established in 1998**
- **Monitored for 4 years**

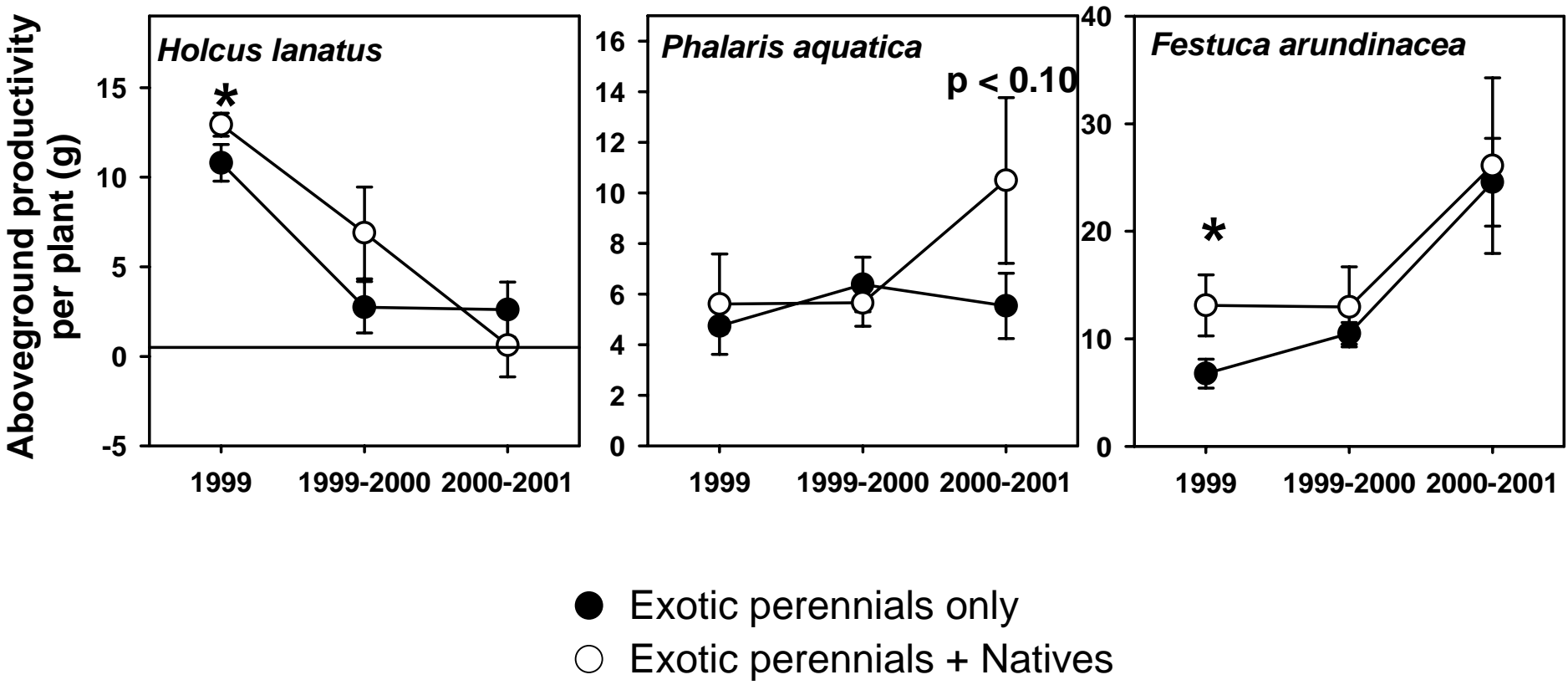
Displacing natives

Natives vs. exotic perennials



Displacing natives

Exotic perennials vs. natives



Displacing natives

Ability to displace natives

- **Asymmetric competitive interactions favor exotic perennials**
- **Observations that invaded habitats can be virtually monocultures**

Impacts of exotic perennial grasses

- Ability to invade coastal ecosystems
- Ability to displace native species
- **Challenges for restoration and management**

Out of the frying pan...



...and into the fire?



Land-use changes associated with rapid invasions

- **Removal of grazing**

Sea Ranch

Pt. Reyes

Bodega Marine Reserve

Land-use changes associated with rapid invasions

- **Removal of grazing**

 - Sea Ranch**

 - Pt. Reyes**

 - Bodega Marine Reserve**

- **Addition of grazing may not favor
native perennial grasses**

Land-use changes associated with rapid invasions

- **Removal of grazing**

 - Sea Ranch**

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 - Bodega Marine Reserve**

- **Addition of grazing may not favor
native perennial grasses**

- **Burning**

Fires favor exotic perennials – especially *Holcus*

Cover

Broom control technique

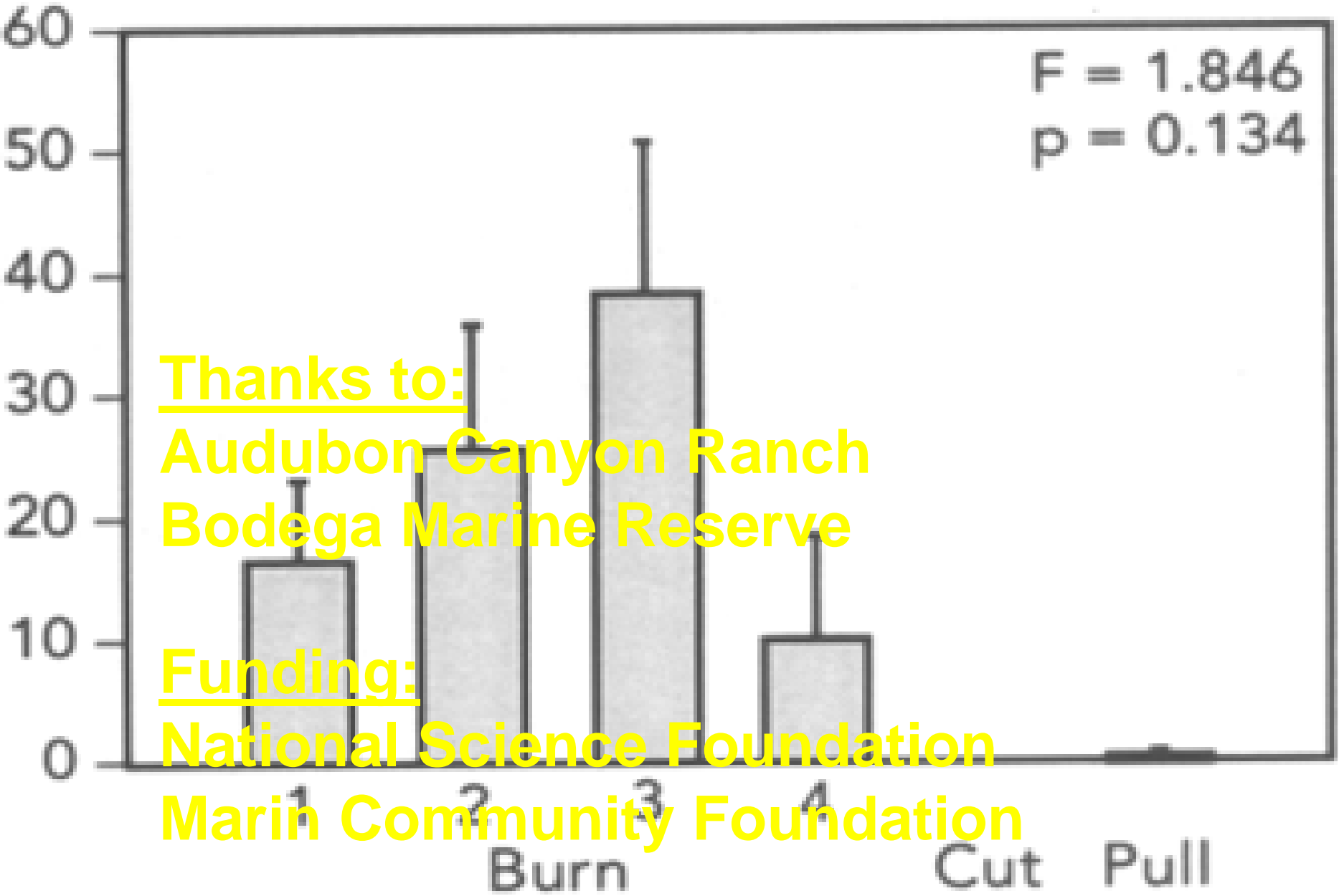
Alexander and
D'Antonio 2002

Recommendations for List A

- **Rapid invaders – Widely observed**
- **Displace natives – YES**
- **Disrupt natural habitats – YES**
 - Exotic annual grasslands**
 - Coastal scrub**
 - Native-dominated prairie**

Exotic Perennial Grasses

F = 1.846
p = 0.134



Thanks to:
Audubon Canyon Ranch
Bodega Marine Reserve

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National Science Foundation
Marin Community Foundation

***Holcus lanatus* abundance**

Sea Ranch – Foin & Hektner 1986

	Ungrazed	Grazed
1974	6-11%	
1976	15%	
1978	21-23%	0%
