

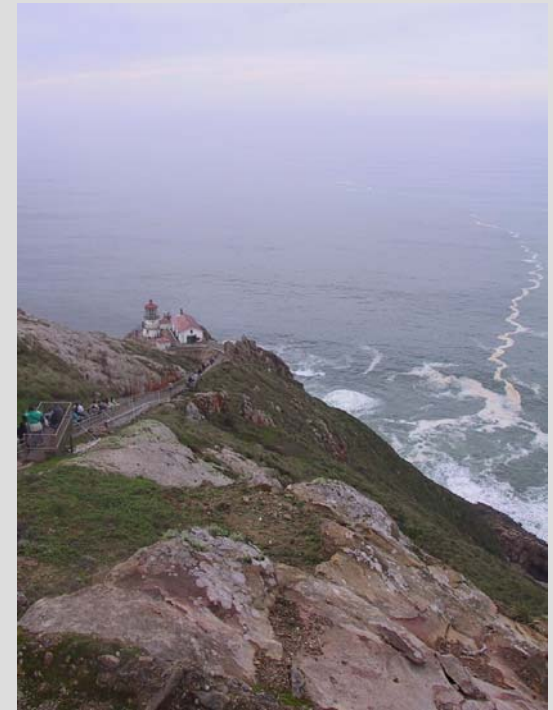


Impacts of Grazing to California Coast Grasslands: State of the science

Sasha Gennet
Bodega Marine Lab
November 6, 2006

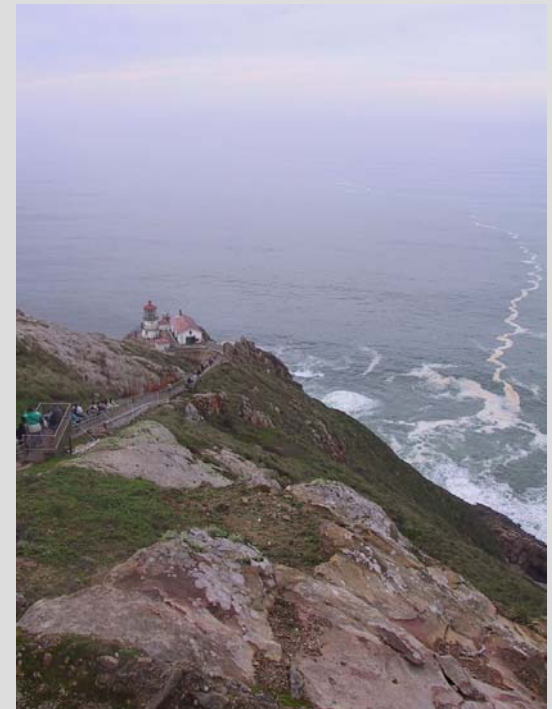
Outline

- Summary of literature findings by resource class
- Knowledge gaps- where and why?
- Coastal grasslands ecological context
- Management and science unite!



Methods

- Database searches
 - Biosis
 - Web of Science
- New book chapters
- Qualitative analysis
 - insufficient studies for quantitative meta-analysis



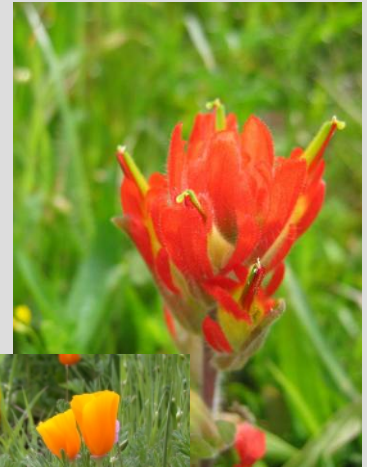
Results: Native grasses

- 3 replicated experimental studies and several long-term, local monitoring studies
- *Nassella pulchra* (**Purple needlegrass**): inconsistent response to grazing
- *Danthonia californica* (**Oatgrass**): positive response
- grazing cessation often preceded a succession to low-growing scrub and dominance by other perennial species
- invasive species e.g. *Holcus lanatus* (**Purple velvetgrass**) may increase
- history of cultivation and microsite characteristics are key factors



Results: Native forbs/wildflowers

- Lack of grazing significantly correlated with lower cover of native forbs and wildflowers
- Thatch and increased height are likely causes
- Species-specific information lacking



Results: Native shrubs

- Grazing negatively impacts native shrubs including *Lupinus* spp. (**Lupines**) and *Baccharis pilularis* (**Coyote brush**)



- Grazing reduces oak regeneration

- Shrub and tree encroachment reduces richness of grass and forb species



Results: Invasive non-natives

- Highly species-specific response to grazing
- Inter-specific competition with natives
- Grazing alone is likely insufficient to permanently restore coastal grasslands to native dominance but may help “tip the balance” or help maintain native populations



Results: Terrestrial vertebrates

- Monitoring studies:
 - lower vertebrate richness in grazed areas
- Experimental studies:
 - no difference in abundances for individual species
 - interaction between livestock and small mammal grazing (**squirrels** and **voles**)
- Few reptile/amphibian studies:
 - Aurora dratonii* (**Red-legged frog**)
positively impacted in stockponds, negatively impacted in riparian corridors



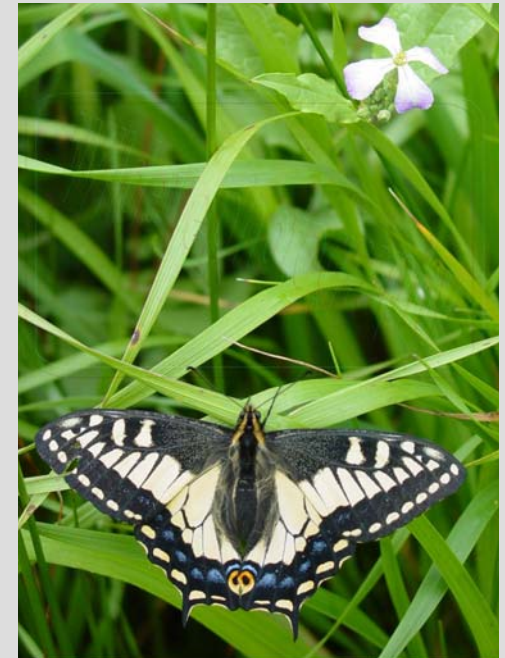
Results: Birds

- Highly species-specific results
- Grassland-dependent species can be negatively impacted (e.g. *Ammodramus savannarum*, Grasshopper sparrow)
- Riparian species can be negatively impacted through reduction of habitat
- Brood parasitists (*Molothrus ater*, Brown-headed cowbirds) and corvids (*Corvus corax*, Common Raven) preferentially utilize grazed areas at PRNS
- Local knowledge and studies are critical



Results: Moths and butterflies

- No other insect studies found
- Species-specific responses
- Some species negatively impacted by disturbance (trampling)
- Intermittent die-back of *Lupinus arboreus* (**Yellow bush lupine**) related to *Hepialus californicus* (**Swift or Ghost moth**)
- At PRNS endangered species *Speyeria zerene myrtleae* (**Myrtle's silverspot butterfly**) may be negatively impacted by heavy grazing but showed no significant difference in abundance between lightly grazed and ungrazed sites



Knowledge Gaps: Where?

- Replicated studies of impacts to plant communities
- Replicated studies of wildlife
- Replicated studies of bird species
- Insects



Knowledge Gaps: Why?

Ecological reasons:

- Non-equilibrium, non-linear ecosystem
- Complex successional pathways
- Species turnover, high beta diversity so studies in one coastal site may not be replicable at another

Additional key factor:

- **Communication Gap!!**



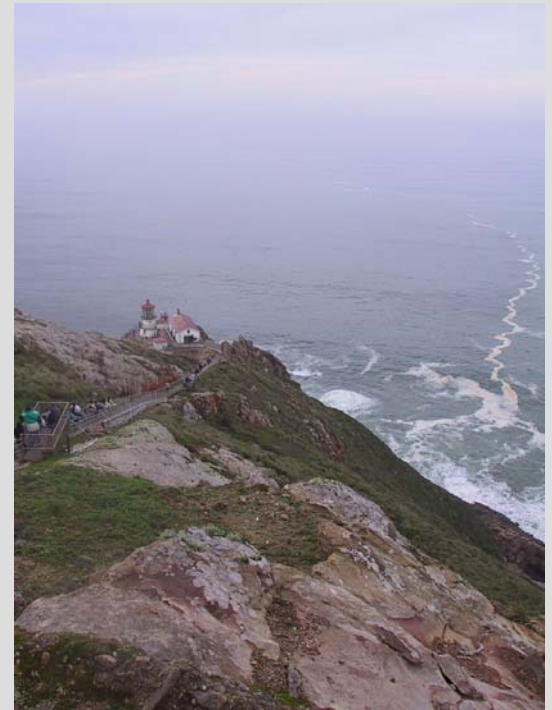
Communication Gap: Why?

- Managers:

- difficulty of obtaining papers
- translating results into management recommendations

- Scientists:

- fear of interpreting results too broadly
- lack of encouragement from academic establishment



Integrating the science

- Literature reviews, syntheses freely available online
- Management priorities as basis for conservation research priorities
- Joint research-monitoring programs
- Respecting all types of knowledge



Acknowledgements

**Point Reyes National Seashore Natural Resources
and Science Staff:**

Don Neubacher

Jane Rodgers

Sarah Allen

Gary Fellers (USGS-BRD)

John DiGregoria

Larry Ford

Grey Hayes