

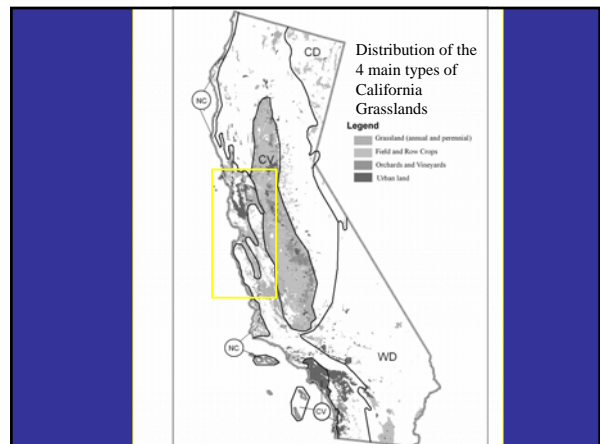


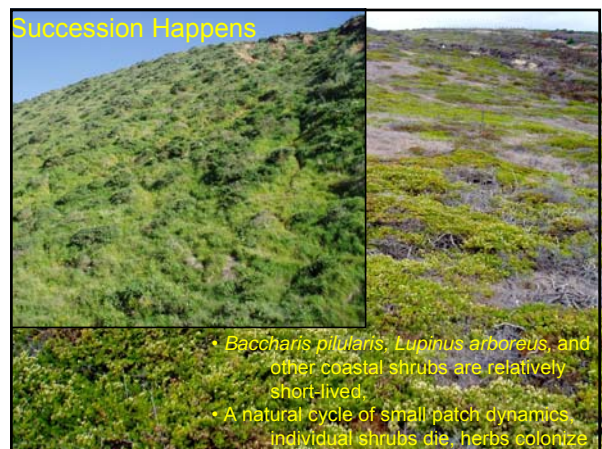
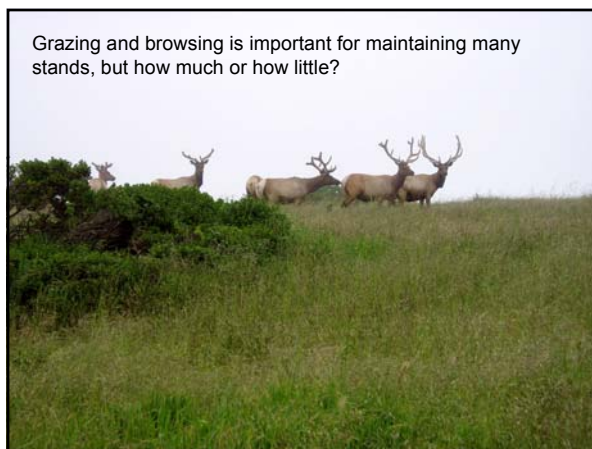
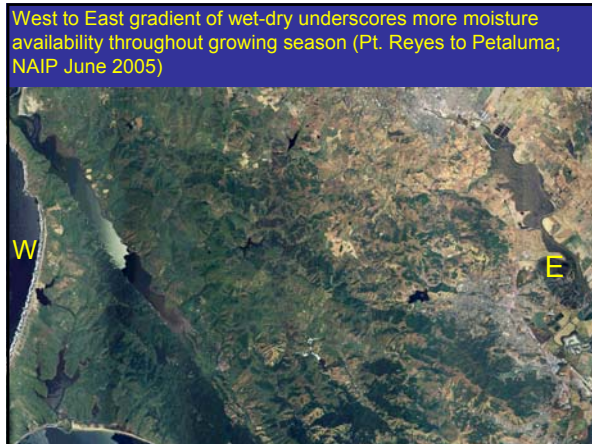
- ### Is it a Prairie?
- An extensive area of flat or rolling, predominantly treeless grassland, especially the large tract or plain of central North America
 - French, from Old French prairie, from Vulgar Latin *prātāria, from Latin prāta, meadow.
 - Level or rolling grassland, especially that found in central North America. Decreasing amounts of rainfall, from 40 in. (100 cm) at the forested eastern edge to less than 12 in. (30 cm) at the desertlike western edge, affect the species composition of the prairie grassland. The vegetation is composed primarily of perennial grasses, with many species of flowering plants of the pea and composite families. The three main types of prairie are the tallgrass prairie; midgrass, or mixed-grass, prairie; and shortgrass prairie, or shortgrass plains. Coastal prairie, Pacific or California prairie, Palouse prairie, and desert plains grassland are covered primarily with combinations of mixed-grass and shortgrass species.*

- ### What is the Conventional Coastal Prairie?
- A.k.a. Fescue-Oatgrass, coastal perennial grassland, bald-hills prairie, part of North Coastal Grassland
 - Has affinities to the grasslands of central and eastern Oregon and the Palouse Prairie of eastern Washington (cool season, moist)
 - Species richness and the amount of cover still provided by natives are higher along the coast than in the Central Valley
 - Ranchers as early as the 1820s also recognized that forage productivity was higher than in the Central Valley

- ### Issues of Clarification
- How do we individuate it from other native CA grasslands?
 - How do we individuate it from non-native coastal grassland (annual and perennial)?
 - How do we tease out seral relationships with woody vegetation such as coastal scrub and coniferous forest?
 - How do we think about its conservation?

- ### Different Perspectives on Coastal Prairie Provide Different Answers
- Broad regional perspectives
 - Sub-regional perspectives
 - Local perspectives







Natural and human-caused fire maintains coastal prairie



Calamagostis nutkaensis will not persist in areas where forest is the natural lifeform



Where do stable, "old growth" coastal grasslands exist?

How can quantitative classification help understand coastal prairie?

- Determine the rules of membership of general types, e.g., grassland vs. shrubland
- Determine rules of membership of specific types, e.g., alliances and associations.
- Understand environmental factors which distinguish different types
- Establish rules for change detection and site quality

What is a Grassland or "Herbland"?

- Vegetation averages < 10% uniform cover of woody plants and at least 10% of grass, grass-like, or other herbaceous plants
- Vegetation dominated by grasses or grass-like plants, and/or forbs
- Species may be annual, and/or perennial
- Vegetation is not permanently wet during the growing season (not a marsh)

Danthonia californica Herbaceous Alliance

California oak grass prairie

Danthonia californica is dominant or co-dominant in the herbaceous layer with other congeners, *Andropogon californicus*, *Andropogon caryi*, *Andropogon scoparius*, *Carex nutkaensis*, *D. pilosa*, *Elychnis sp.*, *Festuca sp.*, *Helictes linearis*, *Stipa confertiflora*, *Aristida arvensis*, *Lolium perenne*, *Muhlenbergia juliflora*, *Muhlenbergia californica*, *Muhlenbergia californica*, *Panicum intermedium*, *Poa pratensis*, *P. secunda*, *Panicum grevillei*, *Panicum apiculatum*, *Bromus californicus*, *B. occidentalis*, *Bromus arvensis*, and *Dicentralean theles*. Emergent trees and shrubs such as *Quercus pilularis* or *Lepidosaphanea* may be present at low cover. Ratio < 1:00 canopy is open to interpretation.

Habitats: Coastal bluffs, valley bottom, floodplains, terraces, slopes, ridge tops. The FIRESCOPE National Inventory (1990) and most herb inventories (*Danthonia californica* as a life-form plant; Howarth et al. 2004).

Barley ranking: CA 55, NW 3. California oak grass prairie. NVC: *Danthonia californica* herbaceous alliance. Calveg: Premont grass. Habitat: Tall hills prairie, Coastal terrace prairie, Great Basin grassland. Mass: Coastal prairie. WFB: Premont grass.

Membership Rules:
Danthonia californica = 10% relative cover in the herbaceous canopy (Kerbo-Walt et al. 2004a).

Life History Traits of Principal Species	Herbaceous prairie	Premont grassland
Life form	Perennial	Perennial
Seed longevity	Short	Short
Rate of dispersal	Animal, wind	Animal, wind
Germination speed	Fast	Fast
Depth of germination	Shallow	Shallow
Seed-bank strategy	Low	Low
Dispersal mode	Animal	Animal
Regeneration	Low	Low
Regeneration	Low	Low

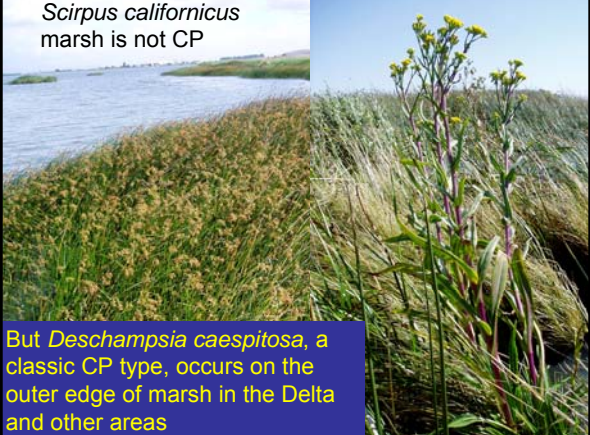
Danthonia californica generally > 25% relative cover in the herbaceous layer (S. Hanks 1996).

Remarks: *Danthonia californica* is a perennial herbaceous with locally dominant, coarse culms. Seedlings establish on bare soil. Plants are tolerant of moderate grazing (Howarth et al. 2004). It occurs in coastal prairie and woodlands. It also can dominate relative cover of low and moderate elevations. Premont grasslands with rich, moist soils along the coast are related to oak grass prairie (Howarth and Hanks 2007). On the north coast north of Mendocino, the coastal prairie occurs in two settings: terrace prairie along the coastline, and the hillside prairie on inland ridges and hillsides. Studies with coastal species composition also occur inland in California where annual rainfall is greater than 100 cm. We include grasslands in these two settings in this alliance. The type was also collected in the region.

Where and how do you draw the line?


- Wetland/marsh types
- Moist grasslands
- Salt meadows
- Are these part of coastal prairie?

Scirpus californicus marsh is not CP



But *Deschampsia caespitosa*, a classic CP type, occurs on the outer edge of marsh in the Delta and other areas

***Deschampsia caespitosa* Herbaceous Alliance**
Tufted hair grass meadows



Habitats: Coastal bluffs, terraces, sand dunes and near coastal flooded areas of moderate salinity, sensitive to slight sea level rise. The IHWPC Wetland Inventory (1996 national list) recognizes *Deschampsia caespitosa* as the CP plant. Elevation: 0-3000 m.

Life History Traits of the Principal Species

Life form	Herbaceous perennial herb
Seed storage	1-2 yr
Seed dispersal	Wind
Germination requirements	Light
Mode of sprouting	Stoloniferous
Survival after fire?	Yes
Shrub cover	No
Shrub cover tolerance	Low
Light tolerance	High
Soil moisture	Low

Membership Rules
Deschampsia caespitosa > 10% relative cover in the herbaceous layer. *Deschampsia polytricha* > 20% absolute cover, but no taller than the tallest grasses (Klein-Wolf et al. 2005).

Remarks
Deschampsia caespitosa is a perennial rhizomatous grass with slender leaves growing to 120 cm in height. In winter, dead leaves protect the immature green leaves. Inflorescence an open panicle bearing small, round, sessile spikelets. Seed accumulation in the soil is mostly episodic and old stratification reduces germination. It is recognized as an aggressive colonizer on disturbed sites.

Dune vegetation includes several native grass-dominated types (*Leymus mollis*). Should they be considered coastal prairie?

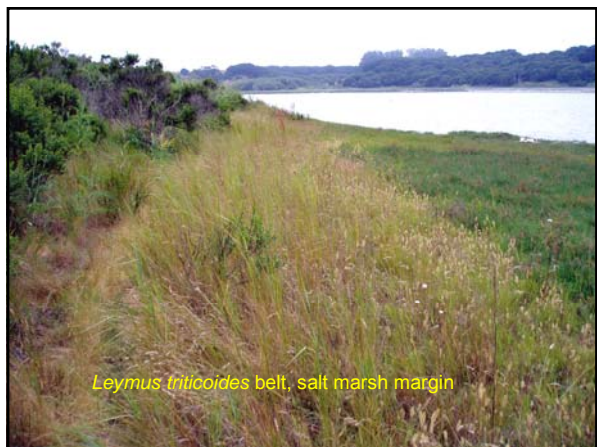
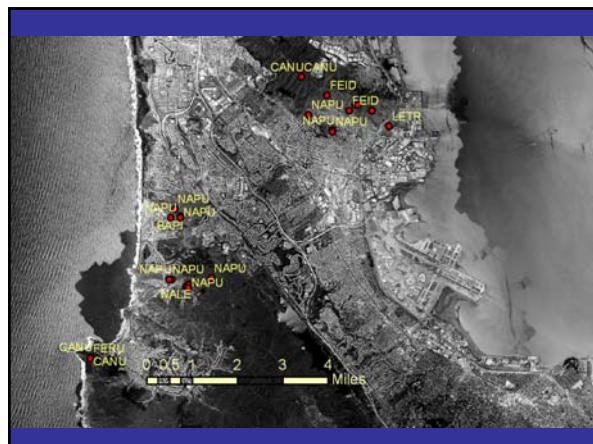


Saltgrass meadows: are they part of the CP matrix?



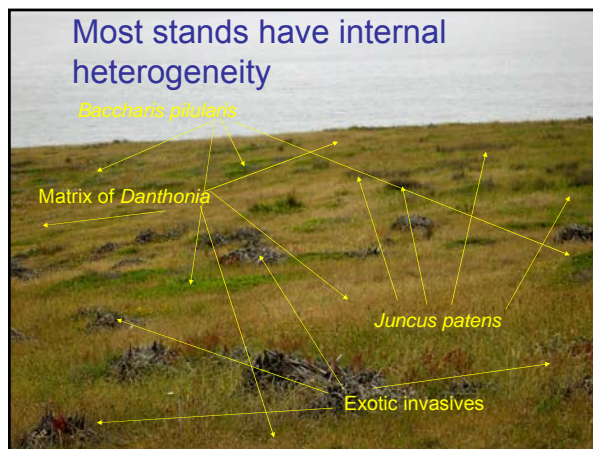
Is this *Juncus balticus*-*Argentina anserina* stand a CP grassland?





A Habitat, or a Community?

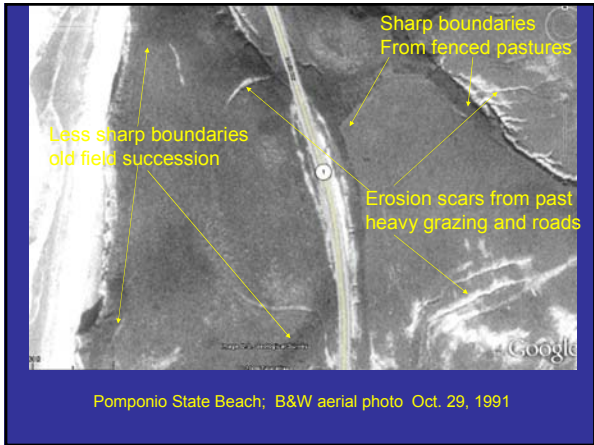
- Coastal Prairie is not just one thing
- It is an amalgamation of communities
 - Small patch size
 - Different successional histories
- A combination of stands driven by hard variables
 - Soil moisture
 - Soil depth
 - Soil texture
 - temperature
- Model of small patch dynamics
 - Landslides
 - Canopy light gaps
 - Salt exposure
 - Fire history
 - Browsing and grazing history
 - Human clearing history

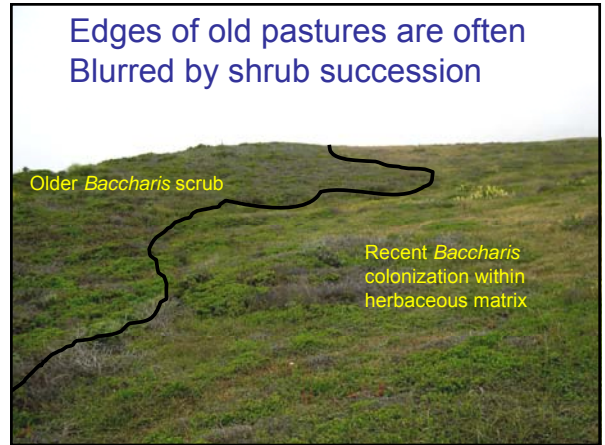




How mapping from air photos can help

- Identify locations of prairie
- Landscape level monitoring
- Identifying range of conditions within a coastal prairie matrix





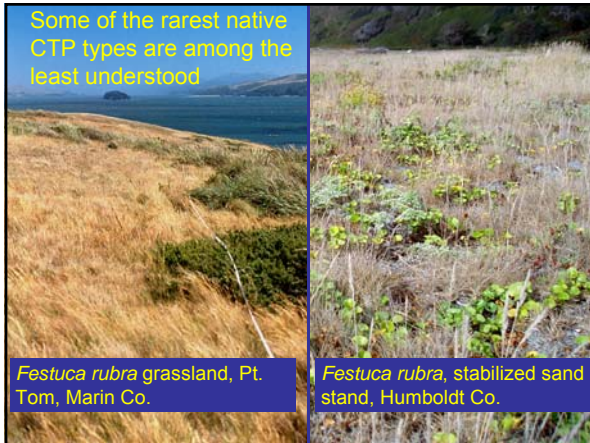
Review of salient characteristics

- Not one vegetation, an assemblage of types
- Defined by relatively high moisture conditions
- Successional relationships to scrub and forest/woodland, the greatest acreage is seral, not stable
- Some types range in similarity from nearly salt and freshwater marsh to upland scrub and woodlands
- Diversity is due to patchy (seral) nature and intermediate moisture and temperature conditions
- Most stands are small
 - Narrow strips based on sharp gradients (e.g., moisture, salinity)
 - Stands limited by natural landscape (e.g., terraces, soil lenses, bluffs)
 - Stands based on small patch dynamics (e.g., clearing, fire, browsing/grazing intensity)

We only partially understand the vegetation of the coastal grasslands

No sampling and analysis of natural variation along the coast or middle North Coast Ranges north of Point Reyes

Some of the rarest native CTP types are among the least understood



Festuca rubra grassland, Pt. Tom, Marin Co.

Festuca rubra, stabilized sand stand, Humboldt Co.

Alliances without good concepts:

- *Festuca californica*
- *Festuca idahoensis*
- *Melica torreyana*
- *Melica californica*
- *Elymus glaucus*
- *Elymus multisetus*
- *Bromus carinatus*
- *Nassella lepida*
- *Hordeum brachyantherum*

Non-native Grasslands

- Perennial (planted for pasture, sustained by higher average moisture than interior CA; diverse and pugnacious)
- Annual (some shared with the interior of the state, but some are more directly related to the coastal moist environment)
- Variable as threats to native biodiversity (some may be reservoirs of nativity)
- Need to understand them and know their ecologies

Nassella pulchra-*Melica californica*-Annual grass Association

Code	Species Name	Con	Avg	Min	Max
NAPU4	<i>Nassella pulchra</i>	100	4.7	1	7
MECA2	<i>Melica californica</i>	100	4.3	1	10
BRHO2	<i>Bromus horreoradicis</i>	89	15.0	10	27
AVBA	<i>Alopecurus pratensis</i>	71	4.4	1	15
CAPV2	<i>Cenchrus cymosepalchatus</i>	71	1.4	1	5
BRD13	<i>Bromus idahoensis</i>	57	3.1	5	18
ESCA2	<i>Eschscholzia californica</i>	57	0.8	0.2	4
AICA	<i>Achillea millefolium</i>	57	0.8	0.2	2
LUB1	<i>Lupinus bicolor</i>	57	0.1	0.2	0.2
TRDE	<i>Trifolium depauperatum</i>	43	0.1	0.2	0.5
BRMA	<i>Bromus maianus</i>	29	1.1	0.2	24
WYGL2	<i>Hesperomima glabra</i>	29	3.9	0.2	20
TRBA	<i>Trifolium barbigerum</i>	29	1.3	2	7
FEID	<i>Festuca idahoensis</i>	29	0.7	0.2	5
ERBO	<i>Eriophorum berytus</i>	29	0.5	0.2	3
GHPO3	<i>Chlorogalum pomeridianum</i>	29	0.3	0.2	2
LOPE	<i>Lolium perenne</i>	29	0.3	1	1
MAGR3	<i>Medicago gracilis</i>	29	0.3	1	1
PLND	<i>Plagiobothrys notholulvus</i>	29	0.3	1	1
ACM2	<i>Achillea millefolium</i>	29	0.2	0.2	1
ELGL	<i>Elymus glaucus</i>	29	0.2	0.2	1
SAB13	<i>Sanicula bipinnatifida</i>	29	0.2	0.2	1
TRBI	<i>Trifolium bifidum</i>	29	0.2	0.2	1
YUM1	<i>Yucca microstachys</i>	29	0.2	0.2	1
ANAR	<i>Arnica montana</i>	29	0.1	0.2	0.5
SIMAZ	<i>Sidaea malviflora</i>	29	0.1	0.2	0.5
AIMME	<i>Aimnolia menziesii</i>	29	0.1	0.2	0.2
DAPU3	<i>Daucus pusillus</i>	29	0.1	0.2	0.2
RACA2	<i>Ranunculus californicus</i>	29	0.1	0.2	0.2
SIBE	<i>Sisyrinchium bellum</i>	29	0.1	0.2	0.2
STAJ	<i>Stachys apiculata</i>	29	0.1	0.2	0.2
TRPU16	<i>Triphysaria pusilla</i>	29	0.1	0.2	0.2

Native grassland: It's not about cover, but constancy





Conclusions

- Sampling and description can greatly assist our understanding of CP
- Vegetation analysis has revised and refined its definition
- Mapping CP can benefit from a good understanding of the underlying ecology
- Definitions and mapping should be done locally and not rely on broad scale concepts

Conservation of coastal prairie should:

- Be based on an understanding of the transitional nature of much of the habitat
- Include understanding of local variation in stands and transitional nature of stands to others of scrub, woodland, and forest
- Not focus on maintaining large homogeneous patches of grassland, but more on fine scale matrix of stages and adjacent vegetation
- Worry less about native purity and more about sustaining and maintaining a naturally functioning matrix of scrub, grassland, and in some cases, forest in a small landscape context