



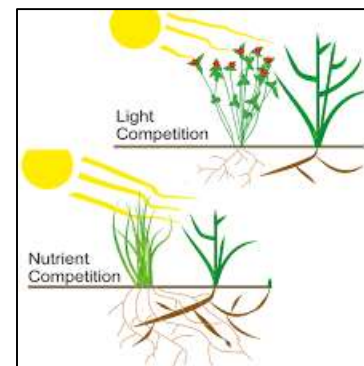
Biological Interventions: Competitive Plantings

Jeanne Hammond
Olofson Environmental
Cal-IPC Non-Chemical Techniques
BMP Training Workshop
02/25/20



What is competitive planting?

- Complex approach to reducing weed cover using competitive advantage of one species, or suite of species, over target weed species
- Component of integrated veg management program
- Can substantially reduce weed cover, ineffective for eradication





- Site conditions – soils, disturbance, etc.
- Weather variability, climate change
- Existing plant communities
- Historic plant communities?
- What are target weed species?

Identifying Possible Competitors



What are characteristics of target weed species AND do they match with possible competitors?

- Perennial or annual
- Grass, shrub, herb
- Growth habit – dense? Rhizomatous/clonal? “weedy” native?
- Phenology - life cycle match
- Native? Non-native as a cover crop???
- Local sources
- Drought “tolerant” – the new normal...
- Consult with locals/experts



More successful IF:

- Existing native plants
- One to few target weed species present
- **Must** be part of integrated veg management program – pre- and post-planting incl. site prep to reduce weed cover/seed bank
- Mesic habitat

Less successful IF:

- Target weeds have superior functional traits to native plants they replace (e.g., plant height, seed production)



How to:



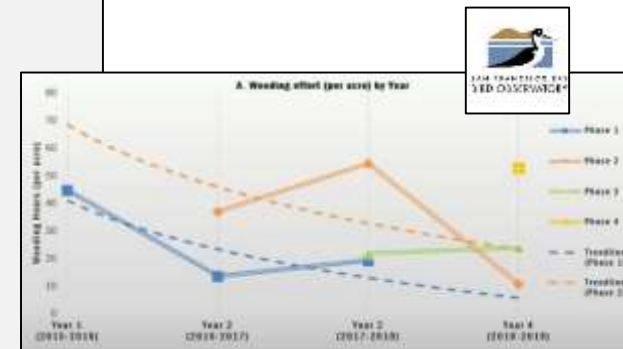
1. Plan and Prep – collect seed, grow plants, prep site

2. Broadcast Seeding and/or Transplanting Plants

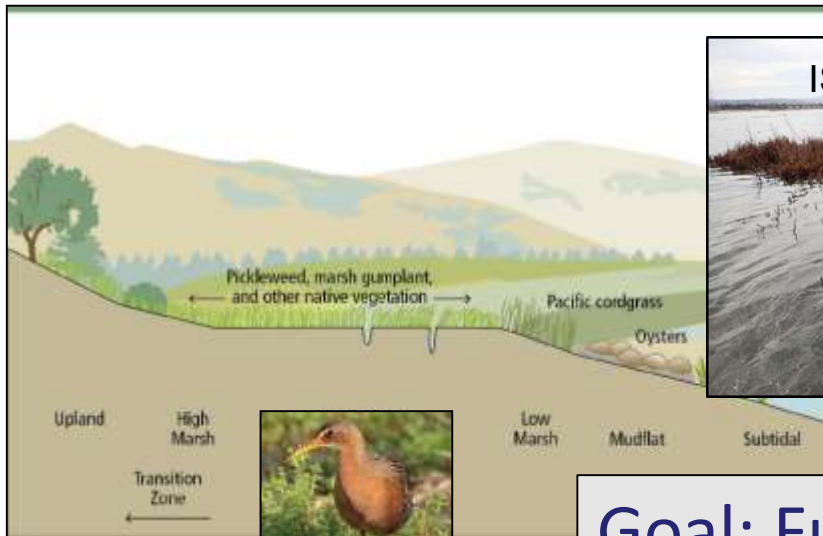
- Site-specific (e.g., seeding rates)
- Seeding not recommended if extensive weed seed bank
- Containers, propagation beds
- Typical restoration techniques (e.g., irrigation, berms/basins, deeper pots in dry soil, tree tubes)
- Design – DENSE, plant portion of site (e.g., islands)
- “Weedy” natives, rhizomatous species

3. Manage

- Weeding, weeding, weeding



Example: SF Bay tidal marsh–upland transition zone



Goal: Functional habitat



LOWLAND GRASSLAND
 Natural widespread co-dominant *Leymus triticoides* in lowland grasslands bordering San Francisco Bay, San Pablo Bay, Suisun Marsh

Floodplain alluvium in diked bayland flooding
 Co-dominants:
Carex barbarae, *Juncus arcticus*

Tidal marsh edge, alluvial plain, alkali soil, ungrazed pasture
 Co-dominants:
Carex praegracilis, *Juncus arcticus*



May 8 2013 Tolay Creek bayland delta



May 13 2010 Rush Ranch, Suisun Marsh

-Peter Baye



Save The Bay

Some ideas: tidal marsh-upland transition zone competitors



T-zone type?

- Natural or constructed
- Soils
- Plant Communities – lowland/alkali grassland, not coastal bluff...



Seed – “weedy” annuals for native cover crop sown between native perennials:

- *Amsinckia intermedia*, *A. menziesii* (robust winter annual)
- *Centromadia pungens* (robust summer annual)
- *Hemizonia congesta* (robust summer annual; subsp. *lutescens* or *luzulifolia*, depending on location/subregion)
- *Madia sativa* (earlier flowering/seeding robust summer annual)

-Peter Baye



Plugs from beds or pots - rhizomatous and/or clonal species for native cover crop:

- *Elymus triticoides*
- *Distichlis spicata*
- *Frankenia salina*
- *Euthamia occidentalis*
- *Carex praegracilis* or other *Carex* sp. (more mesic)



Pots:

- *Baccharis pilularis* – perennial shrub
- *Ambrosia psilostachya* – “weedy” native perennial



Example - Phytophthoras

- “plant destroyers”
- Irish potato famine
- Sudden Oak Death (*P. ramorum*)
- Other species introduced to CA wildlands via nursery container stock
- BMPs for Nurseries



Photos from
www.phytosphere.com
www.suddenoakdeath.org