Controlling common rangeland weeds in the face of changing climate

Fadzayi Mashiri Ph. D.

Livestock and Natural Resources Advisor Mariposa, Merced Counties

County Director Mariposa

UC CE

University of California
Agriculture and Natural Resources

Cooperative Extension

Outline

- How invasive species thrive
- **Medusahead** control
- **Yellow starthistle** control
- **Perennial pepperweed** control
- **Chamise** control
- Implications of changing climate

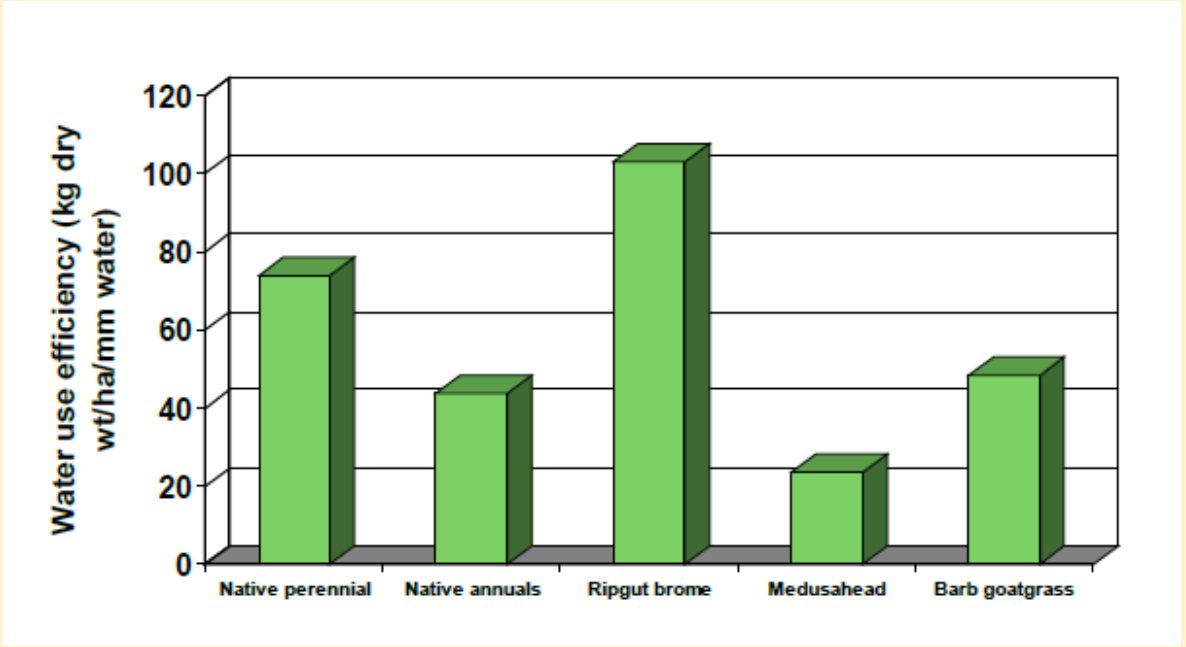
UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Invasive potential

- Early germination
- All season germination
- Stays green longer
- Produces lots of seeds
- Vegetative reproduction
- Higher water efficiency
- Extensive root system
- Low nutritional quality
  - Protein content declines fast with maturity
  - Silica content – low digestibility and decomposition

→Thatch→ monoculture→low forage value

- Mechanical injuries to livestock
- Sprouts back
- Efficient seed dispersal



Medusahead (*Taeniatherum caput-medusae)*

Toolbox for Control

Method	Timing	Outcome/ Advantages	Disadvantages
Hand pulling/ hoeing	• When identifiable • Before seeds set	• Remove whole plants • Effective in small patches/low density	• Not for large/dense infestations
Mowing	• Before seeds set	• Removes forage and seeds • Longer window than grazing	• Not for large areas/ rough terrain
Tillage	• Before seed set • Ideally fall/spring	• Kills plants • Removes thatch • Bury seeds too deep • Seedbed prep • Allows other plants to germinate • Revegetation after	• Rough terrain • May cause erosion

Toolbox cont…

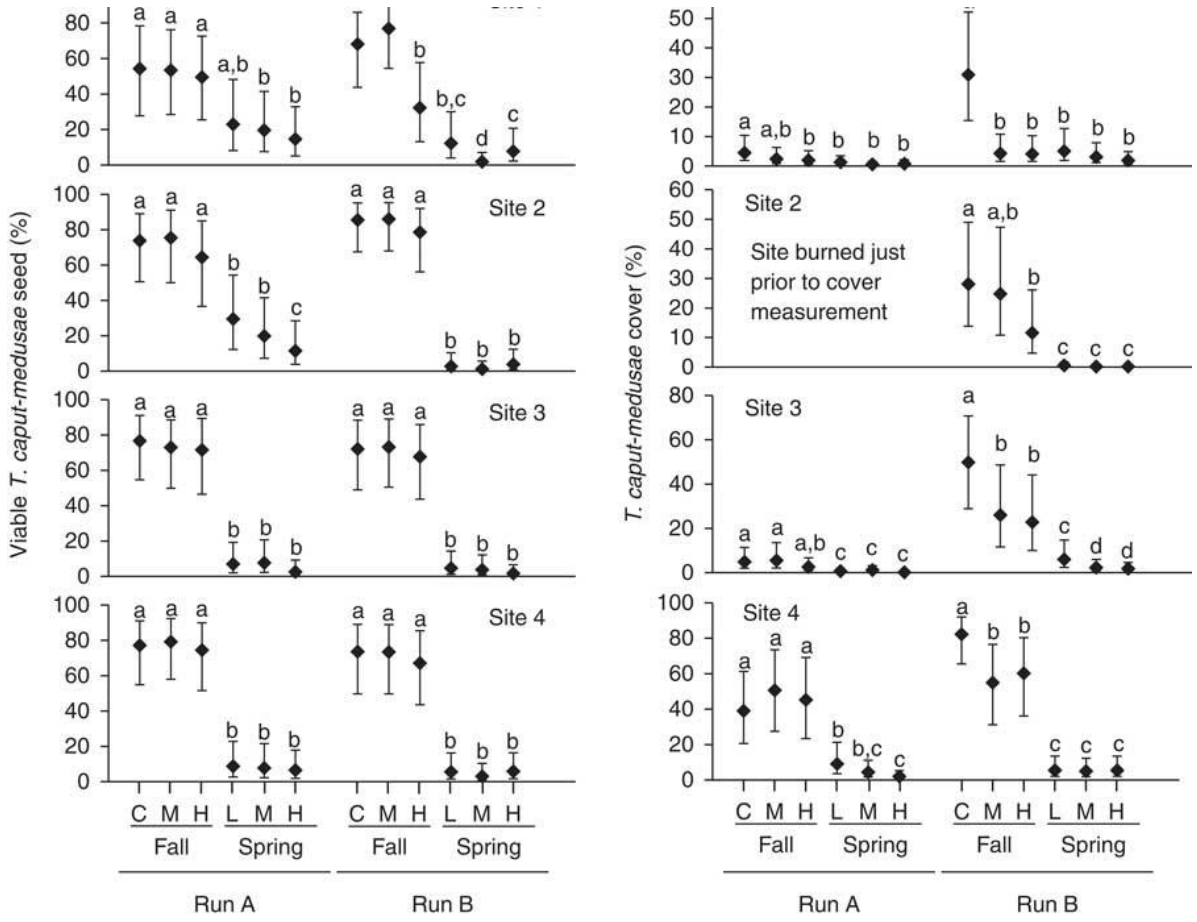
Method	Timing	Outcome/ Advantages	Disadvantages
Seeding / revegetation	• Early weed control • Fall seeding • After tillage/fire	• Provides competition • Improves forage production • Add new desirable species	• Expensive • Low establishment rate
Grazing	• Before it heads out	• Removes forage and seeds • No additional equipment needed, but livestock • Generates revenue in process	• Narrow window • High density needed • Loss of animal condition • (stocker calendar)
Fertilizer/ molasses and grazing	• Before it heads out	• More grazing in fertilized areas • Increases window	• Costly • Short lived effects
Fire	• Dry to carry fire • Before seeds drop	• Removes seeds and thatch • Chance for desirable species to grow	• Low forage production following year • Permitting issues

Toolkit cont

Method	Timing	Effects/ Advantages	Disadvantages
Herbicide : Milestone (Aminopyralid)	• Fall: preemergent	• Prevents germination • Selective effect	• Higher rates (7-14oz/ac) • Short term effects on some desirable plants • Less forage production following year
	• Spring	• Reduces seed viability • Low rates of application 3oz/acre	• Narrow window • Timing inmportant
Herbicide: Glyphosate	• Spring application	• Kills all herbaceous plants • Maybe used to prepare for seeding	• Non-selective • Lower production following year

Spring vs Fall application of milestone

- Figure 1. Percent cover estimates of medusahead at four sites, 1-2 years following fall and spring treatments of aminopyralid. Plots received no herbicide (C) or low (L; 3oz/acre), medium (M; 7oz/acre), or high (H; 14oz/acre) rates of aminopyralid. (*Adapted from Rinella et al, 2018*)



Yellow starthistle (*Centaurea solstitialis)*

Biology

- Long-lived winter annual
- Lower elevation, dry,
- Thrives with lots of light
- Does poorly in low light intensity – north vs south slopes
- Average precipitation 10-60 inches.
- ~30,000 seeds per square meter
- Seed viability >3 years
- Seed germinate fall through spring
- Intensive root systems

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Cultural control

- Cultivation
  - after last spring rains before seeding
- Mowing
  - Moderate frequency -
  - Moderate intensity – not too short/ light
- Grazing
  - Cows, sheep
  - Goats*
  - Good nutrition (11-28% CP)
- Burning

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

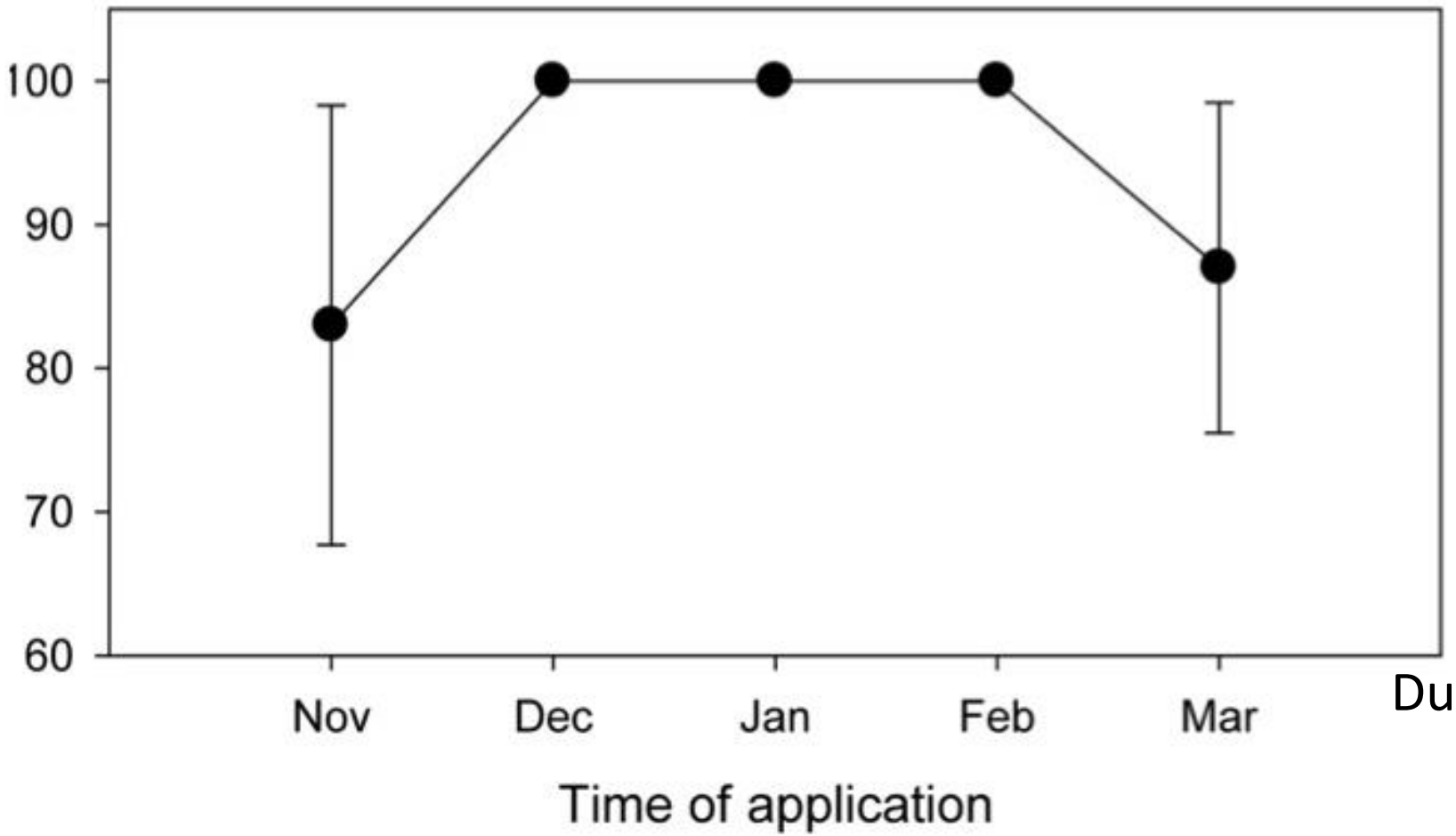
Revegetation

- Competition
- Light intensity

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Chemical control

Milestone control of yellow starthistle at 3 oz/acre



- Transline
- Dicamba
- 2,4 D
- Tricolr
- Glyphosate

Duncan, 2011

Perennial Pepperweed (*Lepidium latifolium*)

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Biology

- Reproduce from perennial roots or seed
- Dead stems are slow to decay
- Extensive root system
- Dense stands displace other vegetation
- Dispersal by water

Photos by Tom Getts

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Cultural control

- Hand pulling
- Grazing with sheep and goats
  - Remove ~85% growth every 3-4weeks
  - Multiple years
  - Combine with herbicide
- Mowing and burning
  - Reduce vegetation build-up
  - Reduce plant vigor
- Revegetation

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Chemical control

- Chlorsulfuron (Telar)
- 2, 4-D
- Glyphosate
- Imazapyr

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension

Intergrated Weed Management approach

- Mowing + tarping
- Mowing + tilling + tarping
- Mowing + Glyphosate (Roundup)
- Mowing + Chlorsulfuron (Telar)

Chamise (*Adenostoma fasciculatum*)

- Native
- Wildlife habitat
- Nesting, browse, shading

Problem:

- High densities
- Low palatability

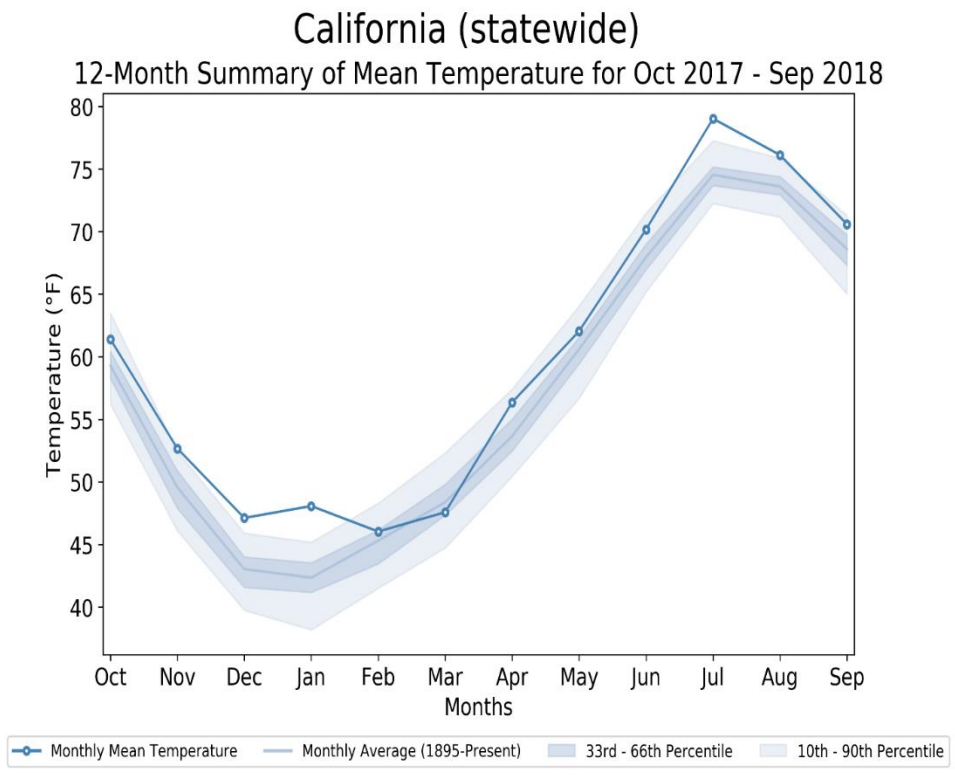
Goal:

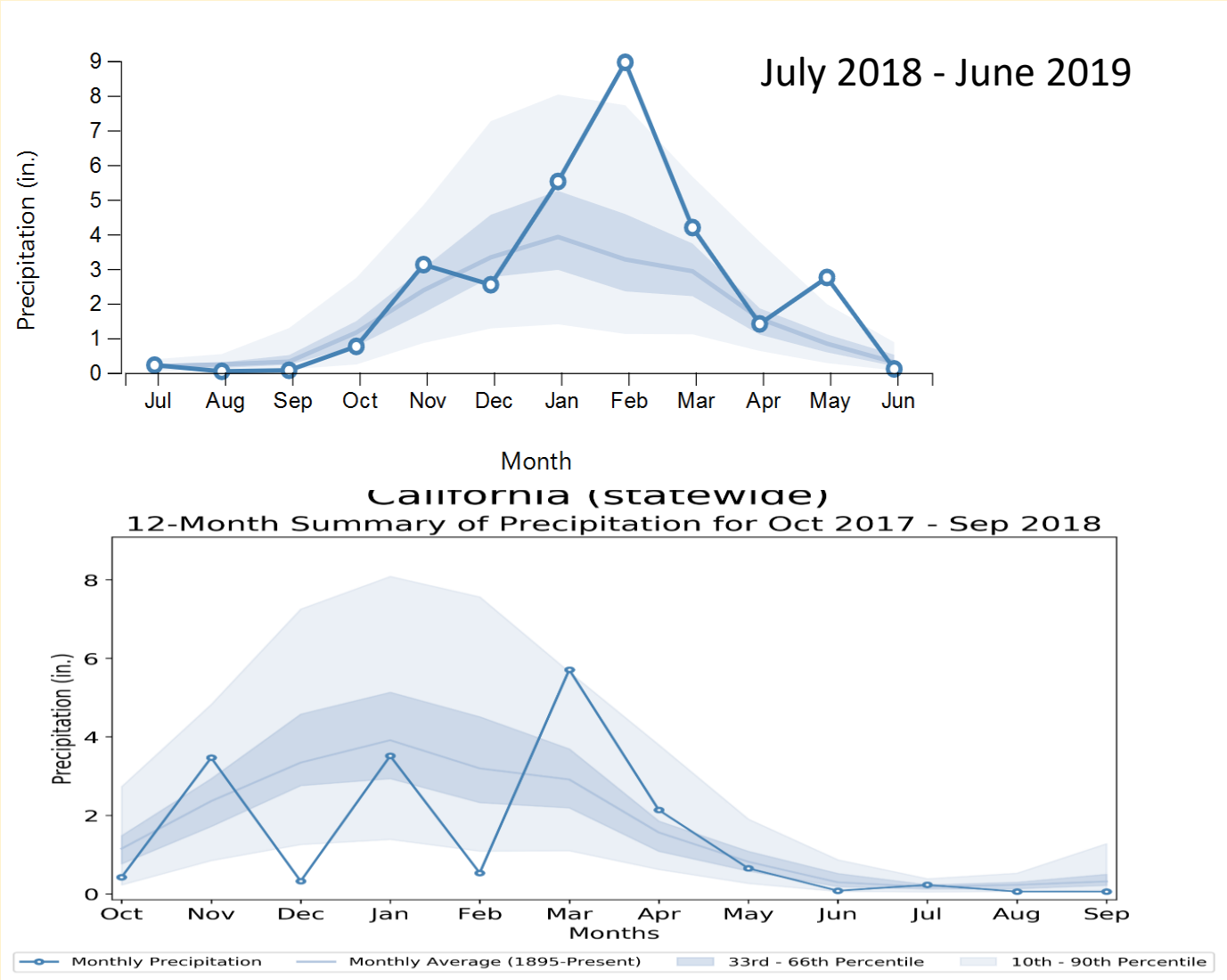
- reduce density and allow wildlife/animal corridors
- Increase forage value

Control methods

- Browse – goats, deer
- Fire
- Mechanical

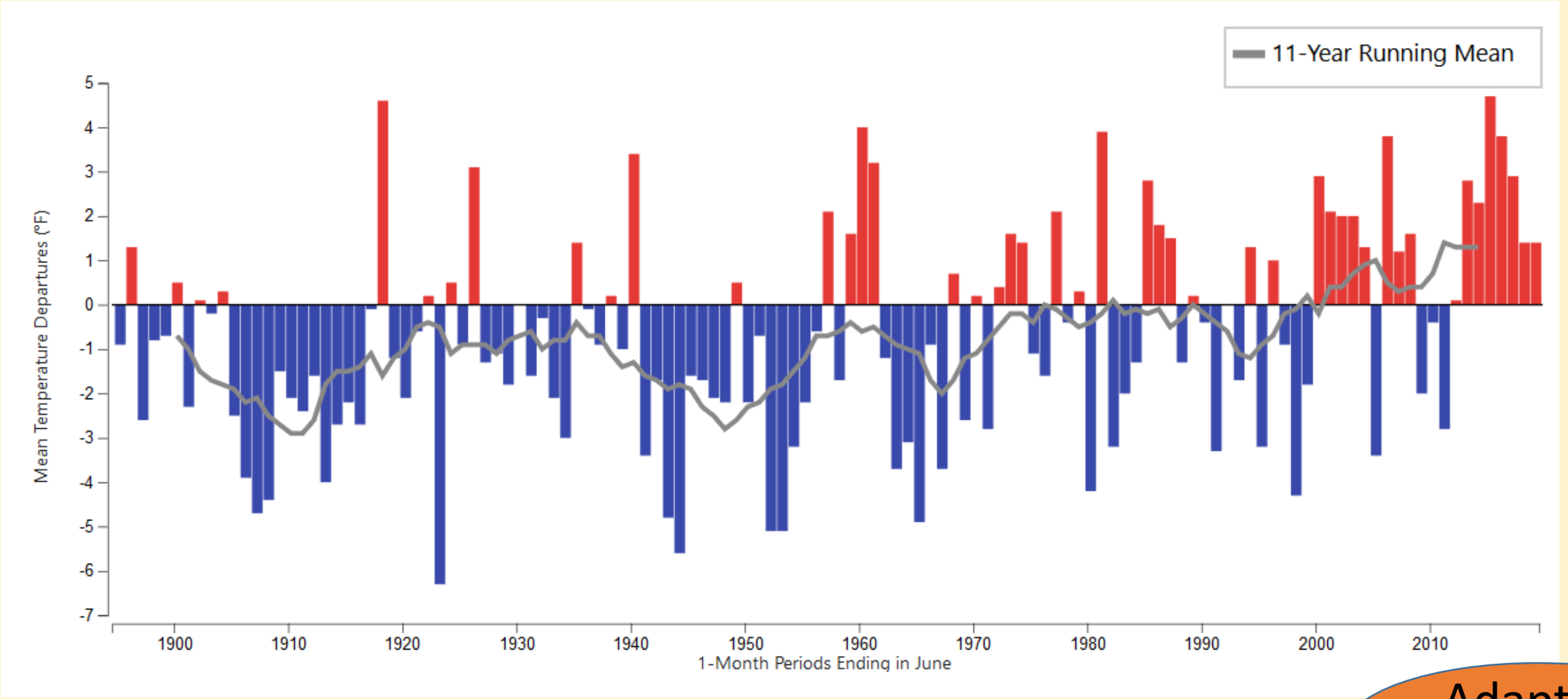
2017/18 and 2018/19 mean monthly temperature and precipitation compared to long-term average





Timing, timing timing!

Mean Temperature departure from 1981-2010 mean



Adaptive Strategies

Questions?

- http://wric.ucdavis.edu/publications/MedusaheadManagementGuide_pub_2014.pdf
- http://ipm.ucanr.edu/PMG/PESTNOTES/pn7402.html
- http://ipm.ucanr.edu/PMG/PESTNOTES/pn74121.html

UC CE
University of California
Agriculture and Natural Resources
Cooperative Extension