Controlling common rangeland weeds in the face of changing climate

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Outline

- How invasive species thrive
- **Medusahead** control
- **Yellow starthistle** control
- **Perennial pepperweed** control
- Changing climate

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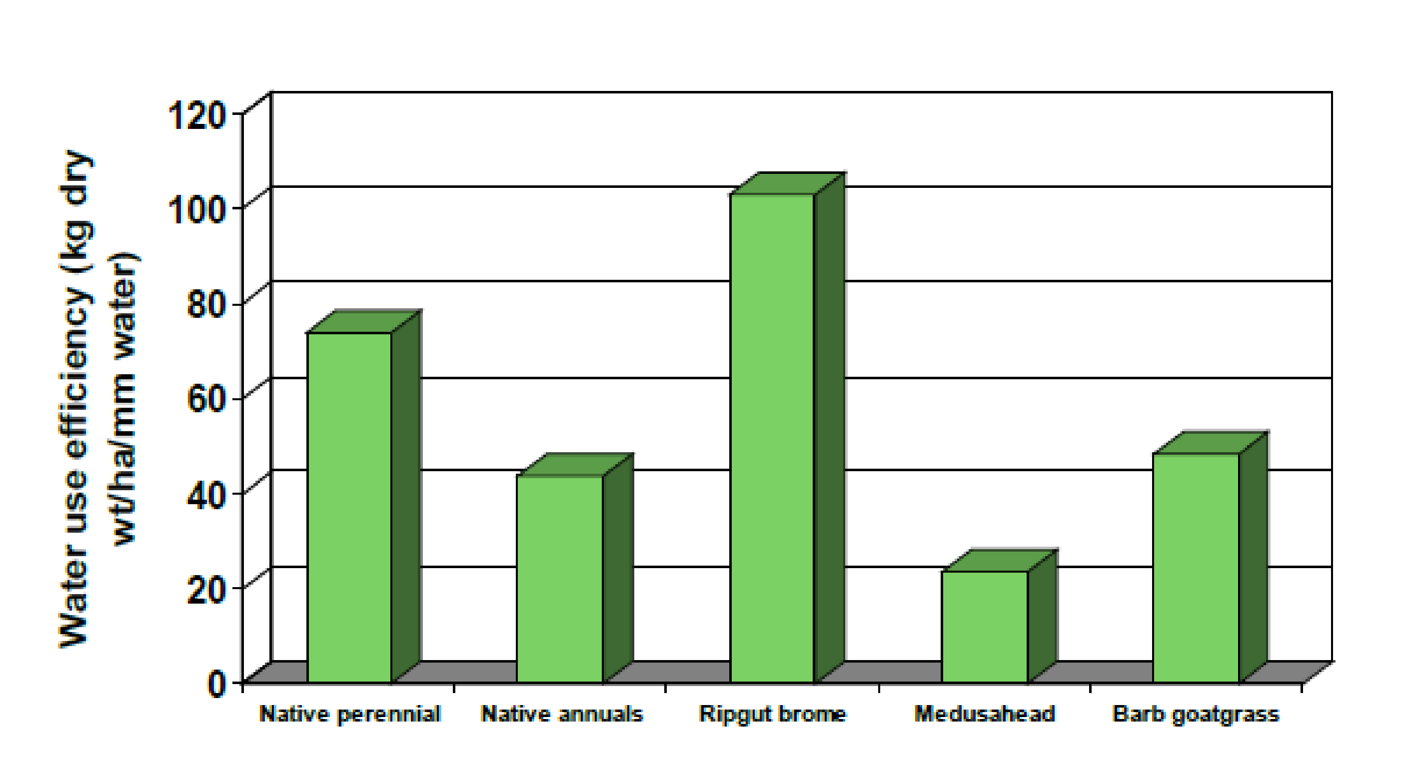
Invasive potential

- 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



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Medusahead control toolkit

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	• Rough terrain • May cause erosion

Toolbox cont…

Method	Timing	Outcome/ Advantages	Disadvantages
Seeding / revegetation	• Early weed control • Fall seeding	• Provides competition • Improves forage production • 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
Herbicide: Glyphosate	• Spring application	• Kills all herbaceous plants • Maybe used to prepare for seeding	• Non-selective • Lower production following year

Yellow starthistle control toolkit

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

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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

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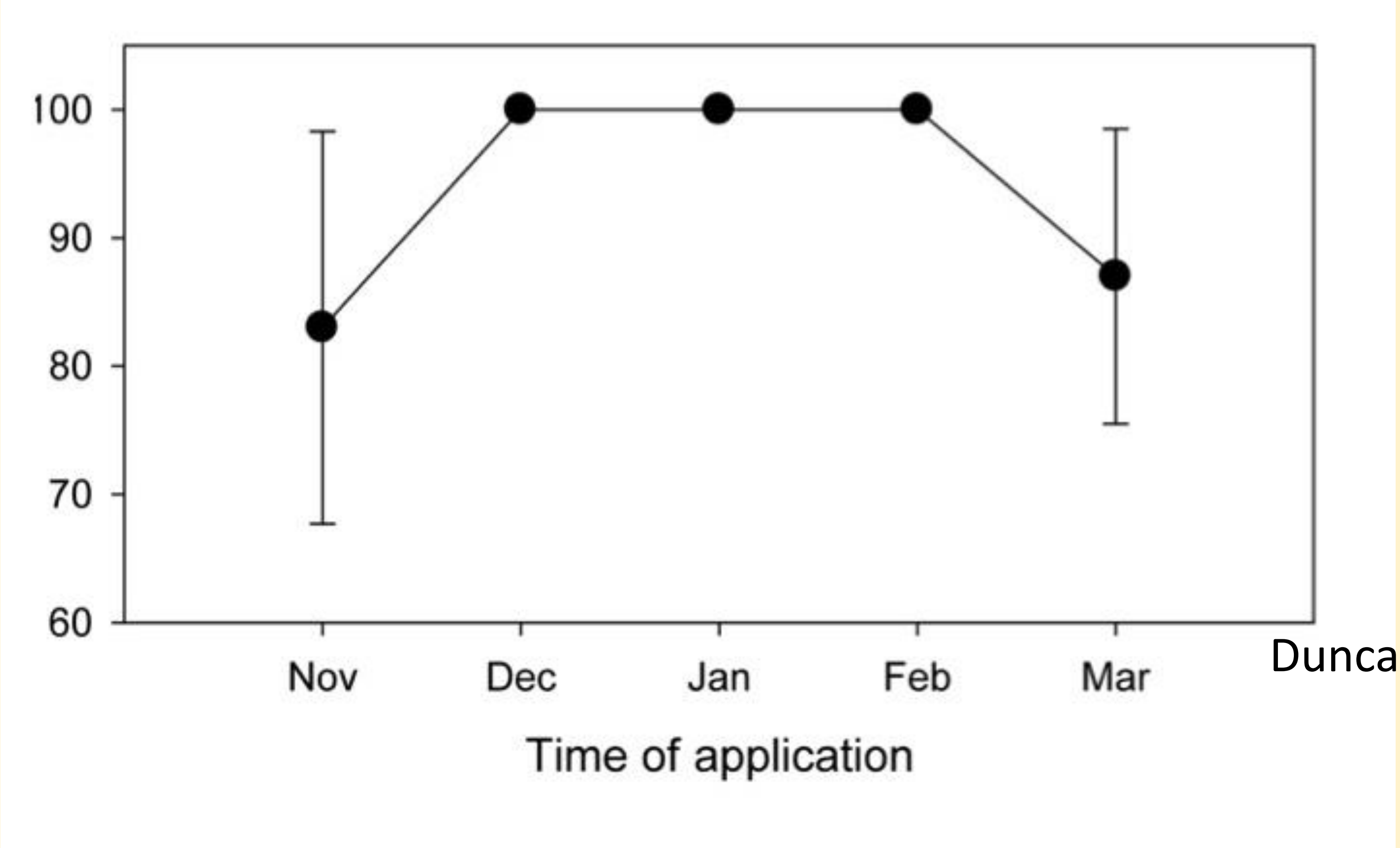
Revegetation

- Competition
- Light intensity

Chemical control

Milestone control of yellow starthistle at 3 oz/acre



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

Duncan, 2011

Perennial Pepperweed

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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

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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

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Chemical control

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

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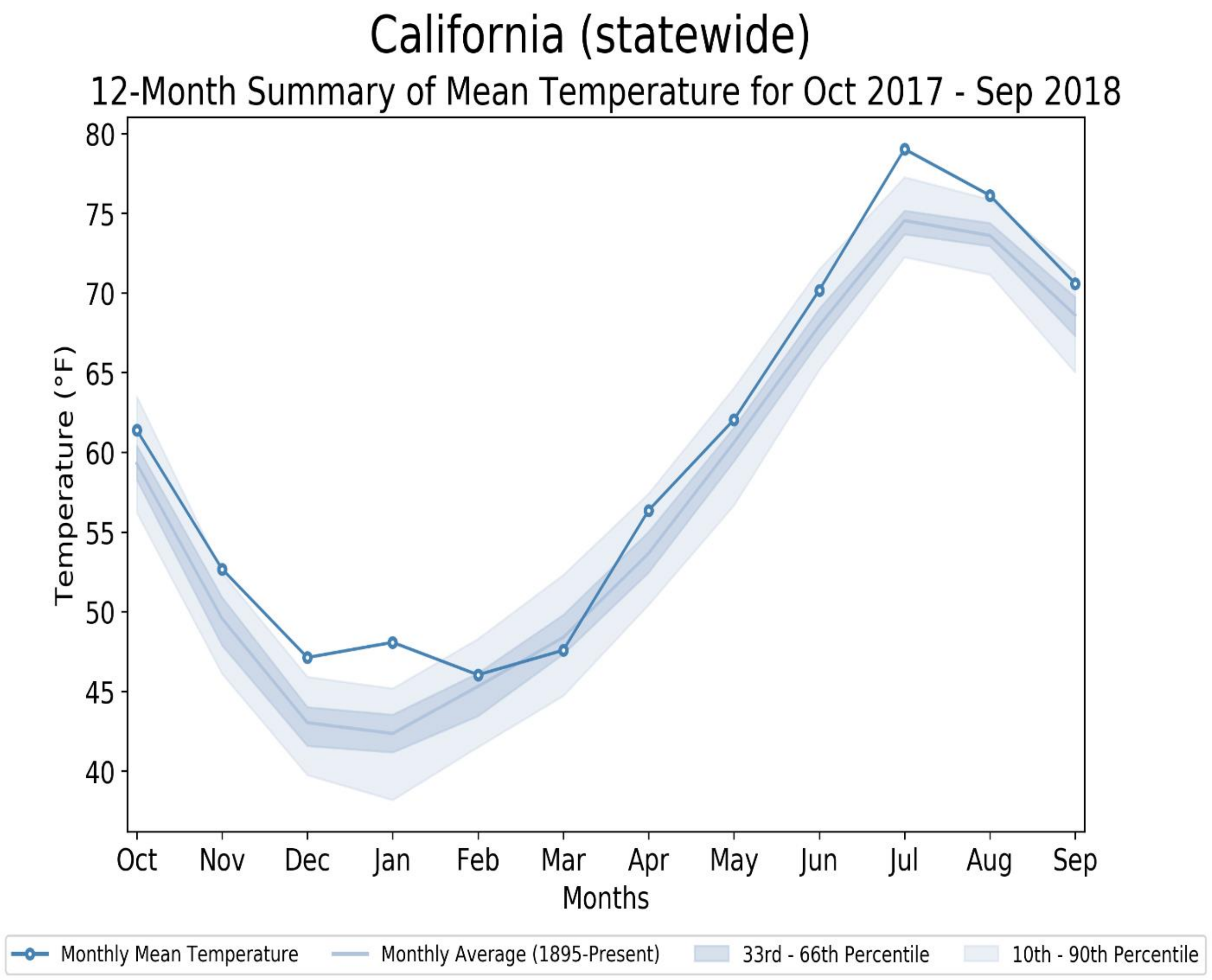
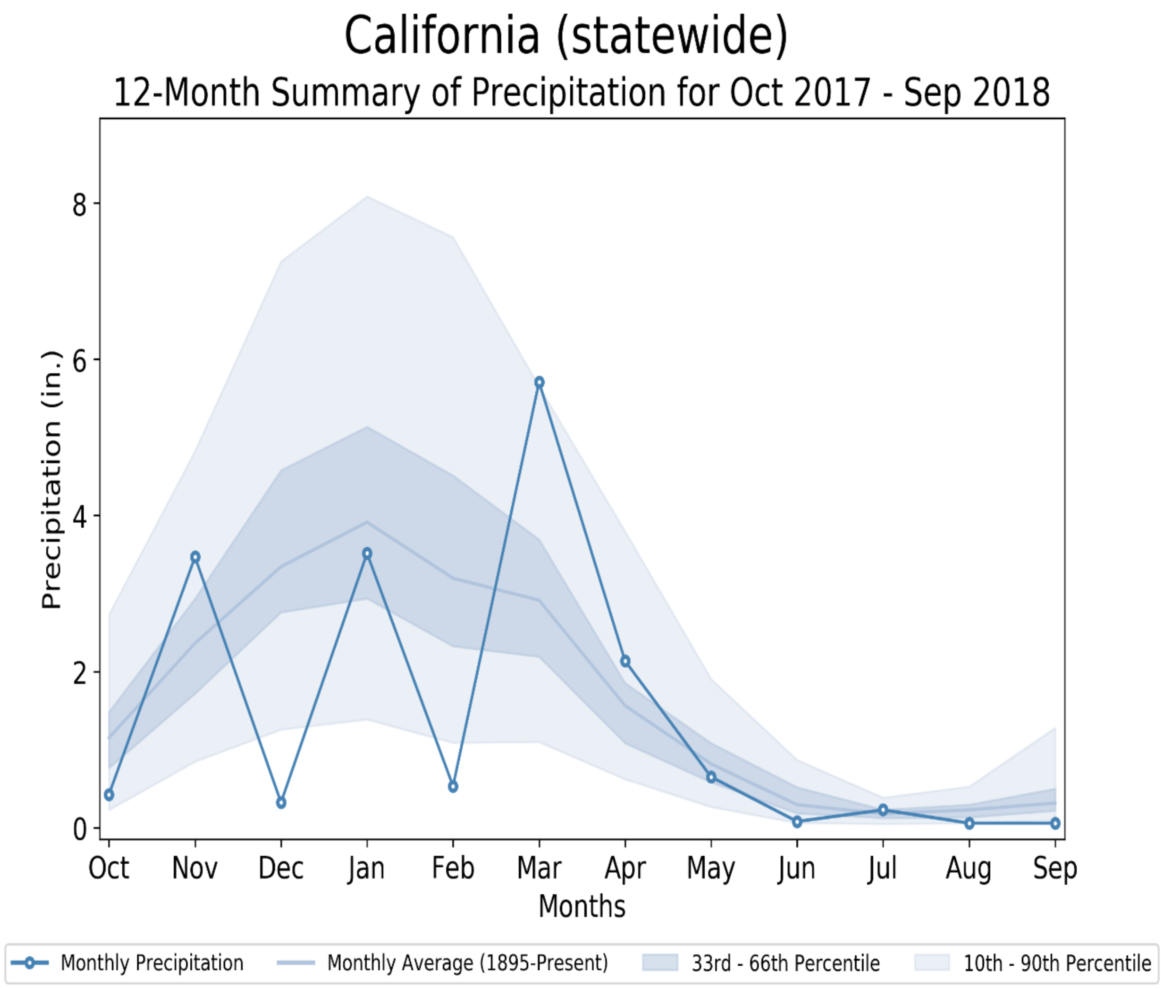
Intergrated Weed Management approach

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

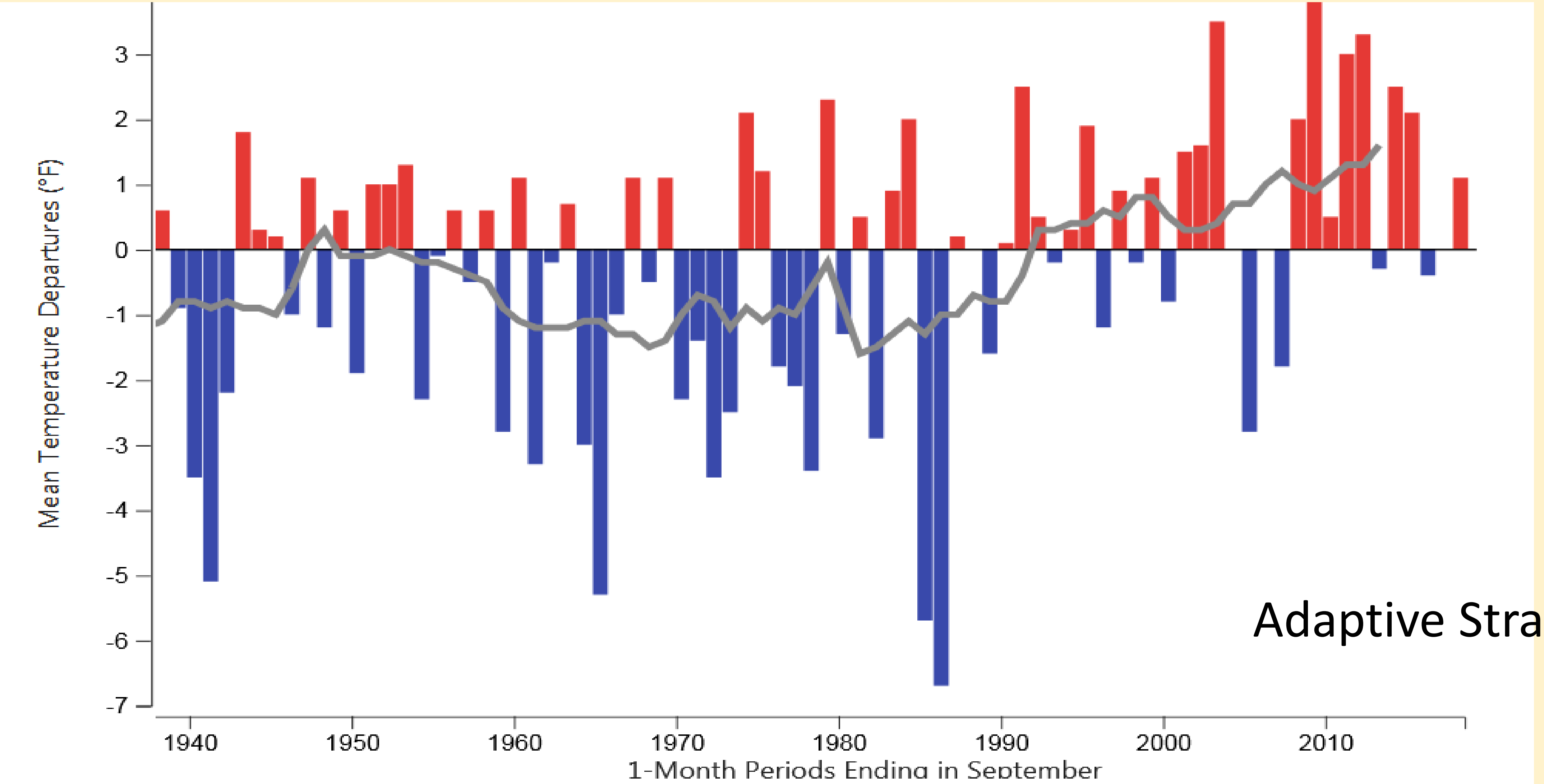
2017/18 mean monthly temperature and precipitation compared to long-term average





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

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