California Rangelands and Prescribed Fire

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Overview

- California rangeland ecosystems and adaptations to fire
- Pros and cons of Rx fire on rangelands
- Rx fire for control of noxious weeds
- Additional resources

California grasslands & oak woodlands

- **Fire-adapted**
  - Grasses produce seeds before fire season (avoidance)
  - Forbs populate burned areas abundantly
  - Oaks often survive or re-sprout (tolerance)

- Uses of Rx fire
  - Weed control
  - Oak management
  - Fuels reduction

California chaparral

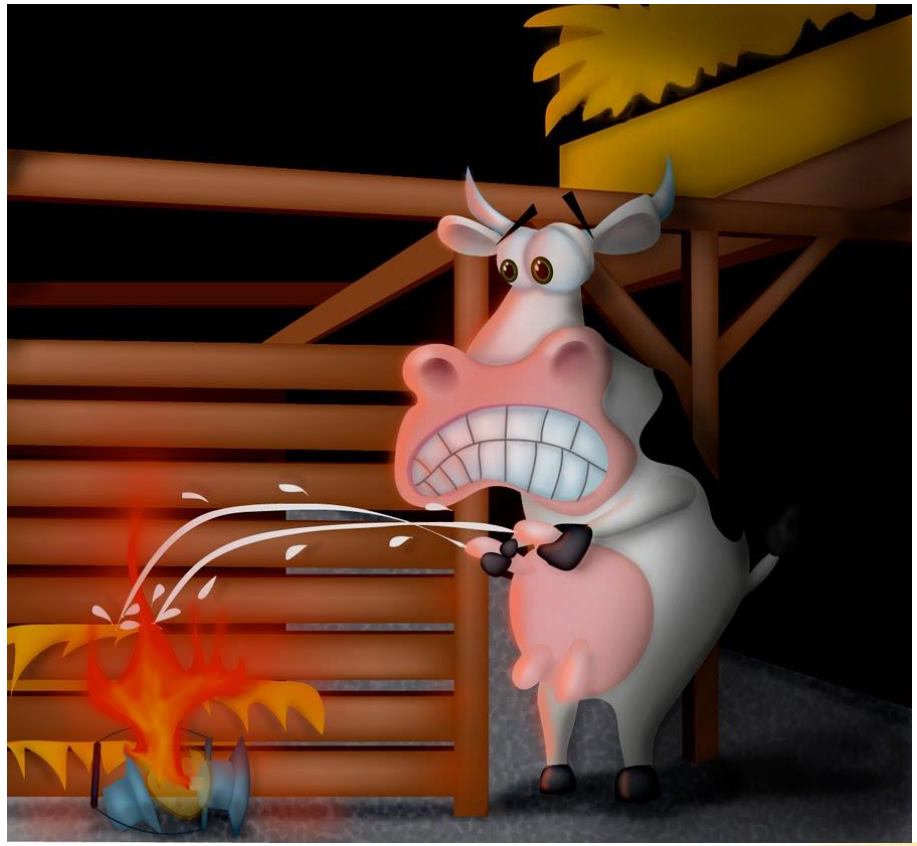
- **Fire-adapted**
  - Some shrubs re-sprout
  - Other shrub seeds germinate post-fire
  - Some forbs germinate post-fire

- Uses of Rx fire
  - Brush reduction/clearing
  - Fuels reduction
  - Weed control

California deserts

- **Not fire-adapted**
  - Large interspaces, few fine fuels = infrequent fire history
  - Invasive grasses + fire = threat
  - Native plants often killed by fire (≤97% mortality)
    - Some sprout after fire (0-60%; depends on species and intensity)
    - Few germinate post-fire
- Little use for Rx fire

Pros & Cons of Rx fire



CONS

- Consumes RDM/organic matter
  - Reduces forage growth next year(s)
  - Requires rest
- Species shifts
  - Increases forbs (toxicity?)
- Liability
- Timing can be challenging
- Can be high $$ for small area treatment

Pros & Cons of Rx fire

PROS

- Goes where equipment & vehicles cannot (low soil dist.)
- Non-selective vegetation removal
  - E.g. combat woody encroachment
- Higher forage value postfire
- Pollinator response
- Healthy acorn crop
- Can be highly cost effective

Example costs of Rx fire - Humboldt Co.

Hunt Burn: June 29th

- 18 acres: Medusahead
- $500: Burn Plan
- $1500: Burn Boss
- $600: VFD Stipends
- $100: Air Quality + other
  - $150/acre

Hunt Burn 2: Dec 19th

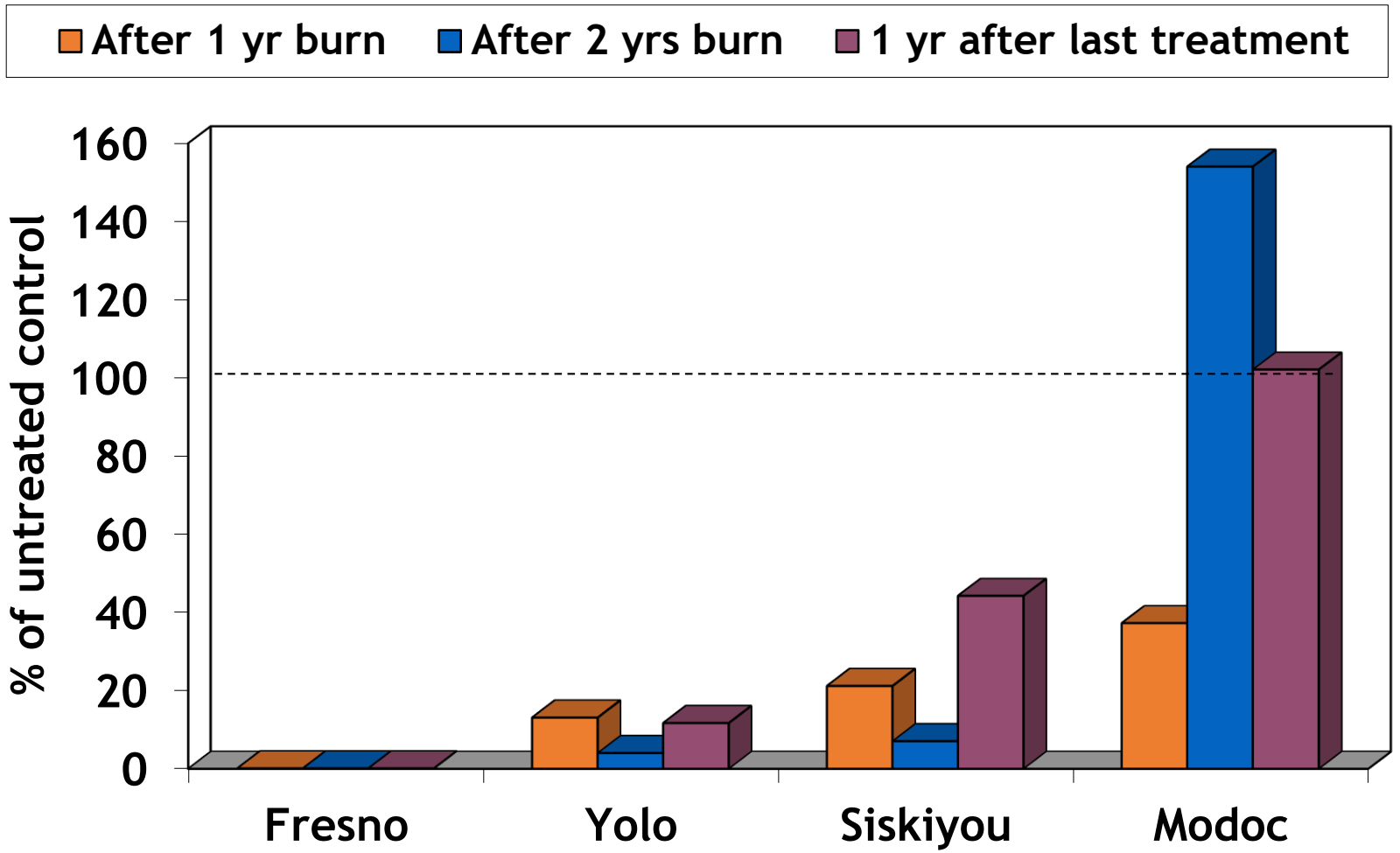
- 13 acres: Restored Oak Woodland
- No Burn Plan
- No Burn Boss
- $100: Air Quality + other
  - $8/acre

Moore Burns: April 25th

- 5 acres (over 1k acres): Scattered Blackberry
- $500: Burn Plan
- $1500: Burn Boss
  - (NRCS Requirements)
- $100: Air Quality + other
  - $420/acre

Rx fire for weed control

Burning to control medusahead

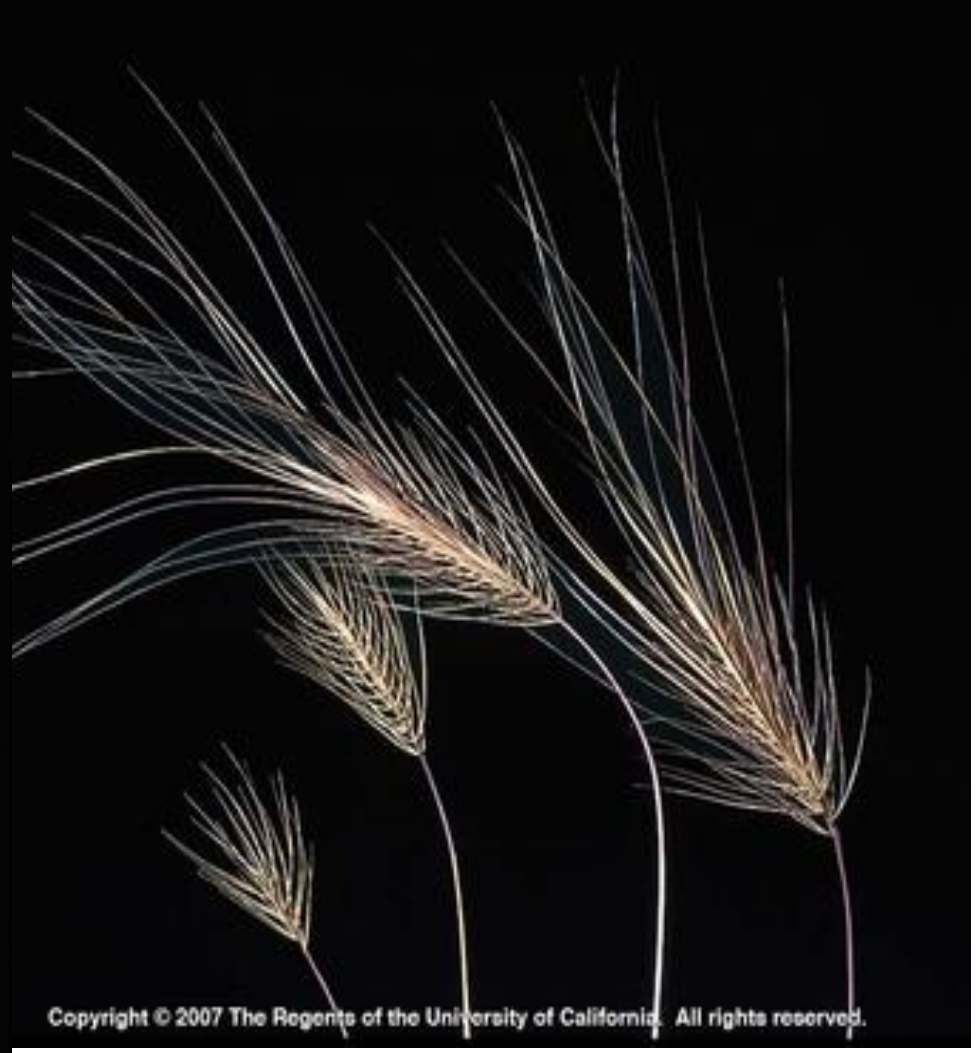


Yellow starthistle response to fire

Table 1.

Yellow Starthistle Seedbank and Seedling Counts Following Burns

Burn Sequence	Seeds per square meter; 5 cm deep (percent of unburned)	Seedlings per square meter (percent of unburned)
Unburned	10,000	1,400
After 1 burn	2,600 (26)	265 (19)
After 3 burns	52 (0.5)	5 (0.4)



Medusahead

(*Taeniatherum caput-medusae*)

Barb goatgrass

(*Aegilops triuncialis*)

Yellow starthistle
(*Centaurea solstitialis*)

Medusahead, goatgrass & yellow starthistle

- Native to Mediterranean, Middle East and Central Asia
- First in U.S. late 1800s-early 1900s

- Medusahead currently infests >2.5 million ac across western U.S.

- Barb goatgrass not as abundant, but spreading rapidly

- Yellow starthistle infests ~15 million ac in California

Problematic species

- Transformer species –monocultures
- Poor forage, unpalatable
  - Reduces grazing capacity up to 80%
  - Awns/spines can injure animals
  - YST poisonous to horses

- YST can be nutritious early on, but less palatable with age
- Mh and Bgg high in silica, low in nutrients, slow to decay
  - Thick thatch

Life cycle

- Winter annuals
  - Most germinate with first fall rains
  - Can germinate in spring
- Early growth focused on root development
  - More competitive than other annuals
  - Stay green longer
- Flower, set seed and die in summer

Reproduction and establishment

Seed dispersal

- Falling to ground
- Animals
- Contaminated feed
- Clothing/equipment

- Seed prevention is **key**

Burning YST, Mh, Bgg

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul

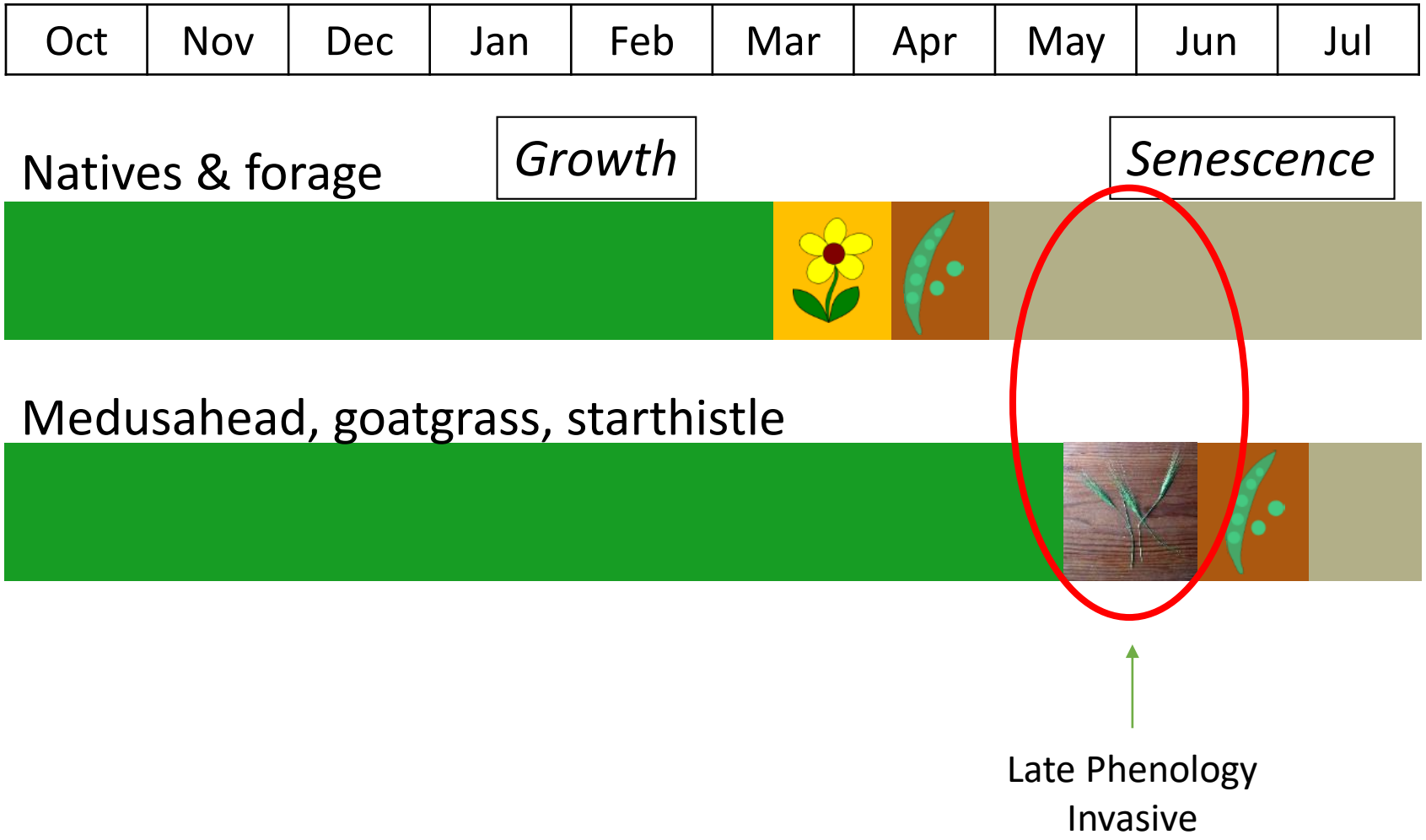
Growth

Senescence

Natives & forage

Medusahead, goatgrass, starthistle

Burning YST, Mh, Bgg



Burning timing

Late spring / early summer

- Before viable seeds are produced (late April – early June)
  - Early flower
- Need adequate dry fuel to carry fire
  - Avoid damage to desired forages
- If fire is late, dropped seeds likely to survive on soil surface

Burning timing

Fall

- Kill newly germinated seedlings
- Target a dry period after fall green-up
- Need adequate dry fuel
- Very short treatment window

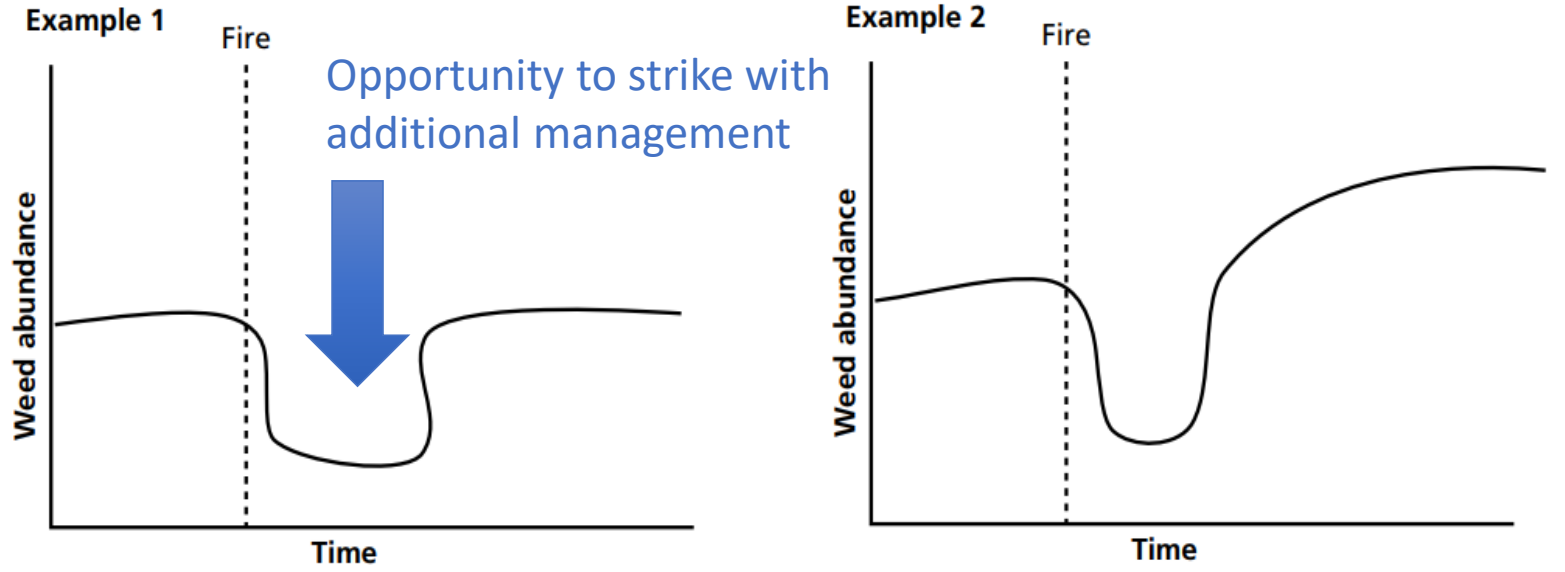
Burning – other considerations

- Burning creates bare ground & releases nutrients
- Reseeding may be required
- Goatgrass and starthistle are “released” after a burn
  - Treat in the following year with another control strategy

Burning – other considerations

Figure 2. B-type hypothetical weed response to fire. Examples 1 and 2 show species which undergo short-term decrease post-fire. Example 1 shows a species which then recovers to an abundance similar to pre-fire, while example 2 shows a species which continues to increase in abundance post-fire.

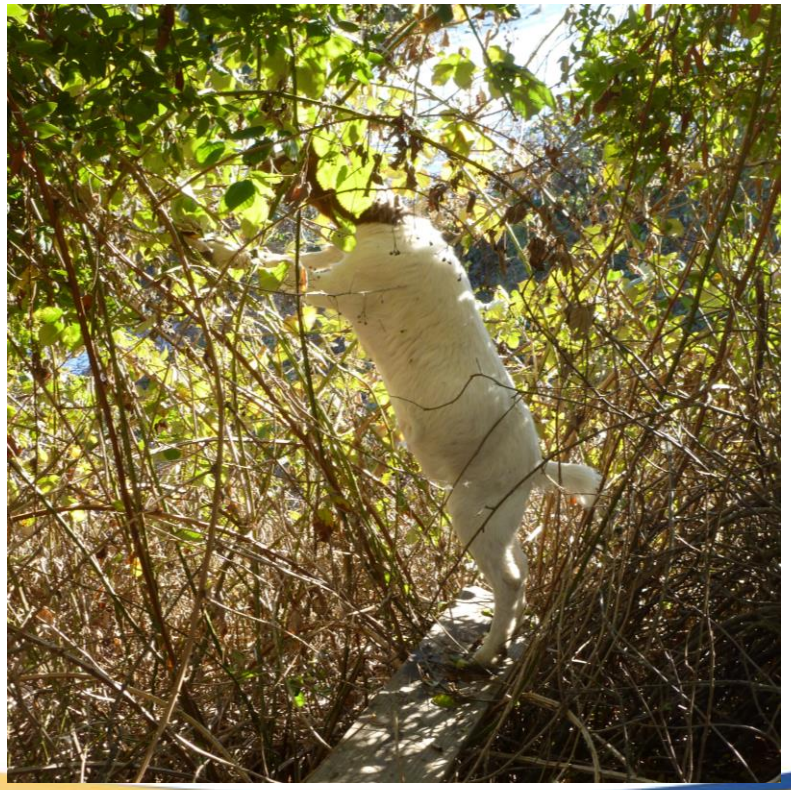
(B) Post-fire short-term decrease (control opportunity):
weakened in the short-term abundance will remain the same or increase slowly in the longer term



Burning – other considerations

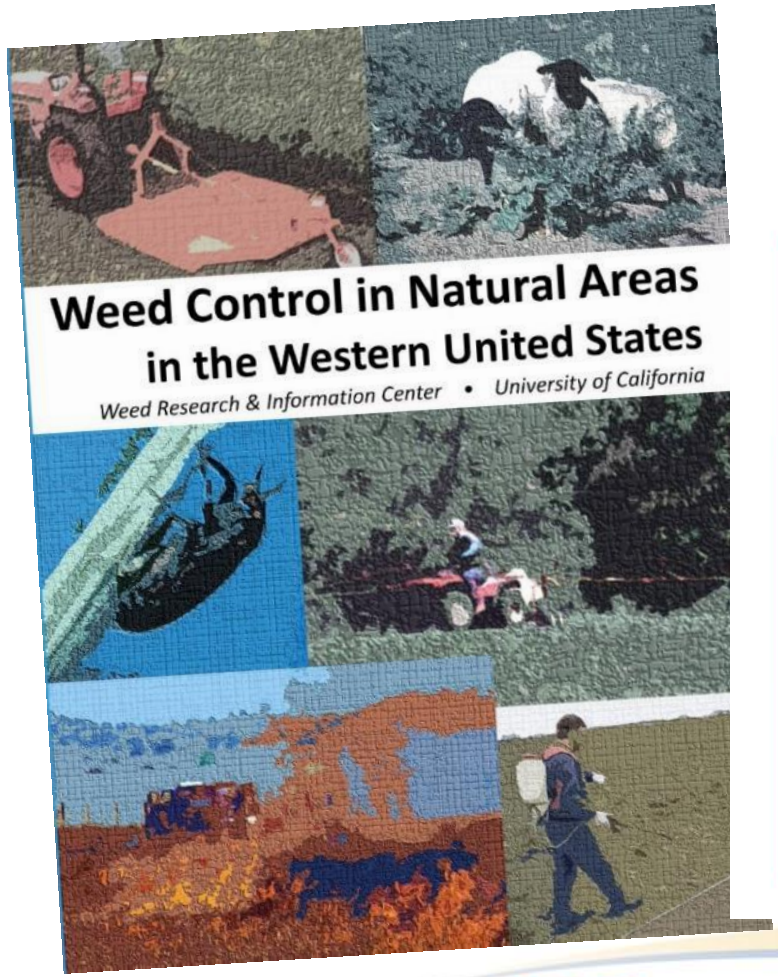
- Can be difficult to burn two years in a row

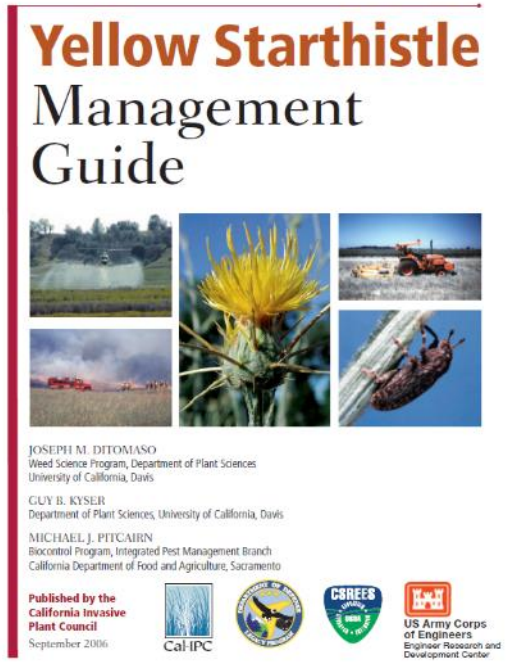
- Grazing and fire interact
  - Fire can alter grazing patterns: location, forage choices
  - Grazing can alter fuel continuity and loading
  - Species of grazing animal matters
    - Horses
    - Cattle
    - Sheep
    - Goats



Berries burn better once compacted by snow or livestock…

Additional resources





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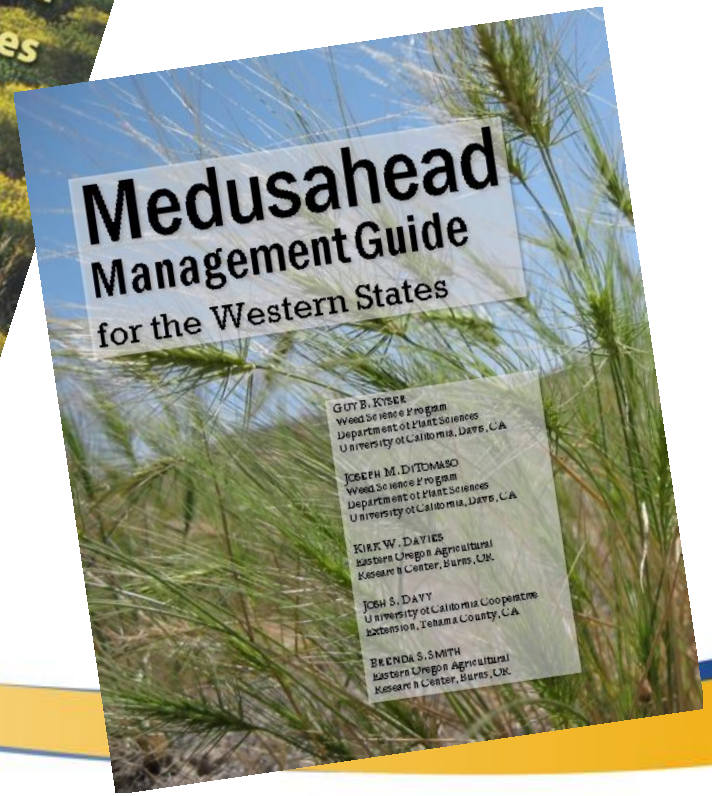

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Thank you!

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