

Prescribed Fire on California Rangelands



Jeff Stackhouse

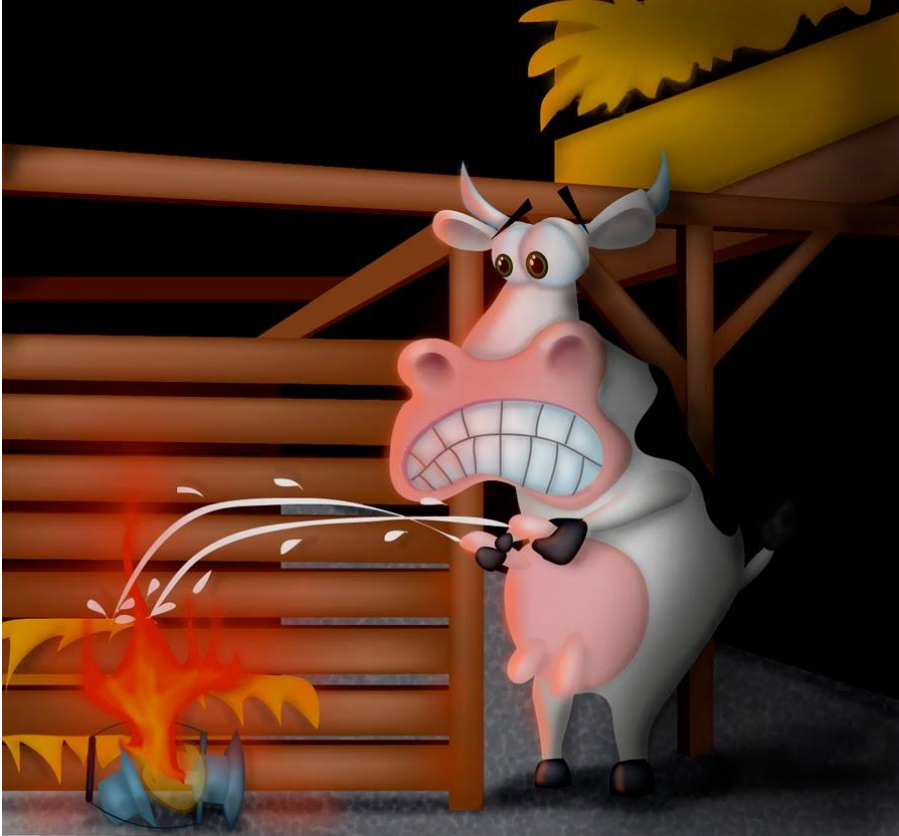
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What affects the bottom dollar?

- lbs on the truck
- 2.5% body weight dry matter forage/day
- Unlike trees, fire cannot be used to burn the understory of forage.
- Drought is unpredictable
- Hay is expensive



Bad idea!



- Consumes RDM
- Requires rest.
- Alters rotational systems.
- Consumes organic matter reserved for soil.
- Reduces forage growth subsequent year(s).
- Liability
- Increases forbs (toxic?)
- Attracts free grazers (ungulates).

Benefits of Fire

- Goes where 4-wheeler cannot (min. soil dist.)
- Non-selective consumer of forage.
- Can kill those nasty woody species.
- Fresh forage with increased quality and palatability.
 - Alter grazing season?

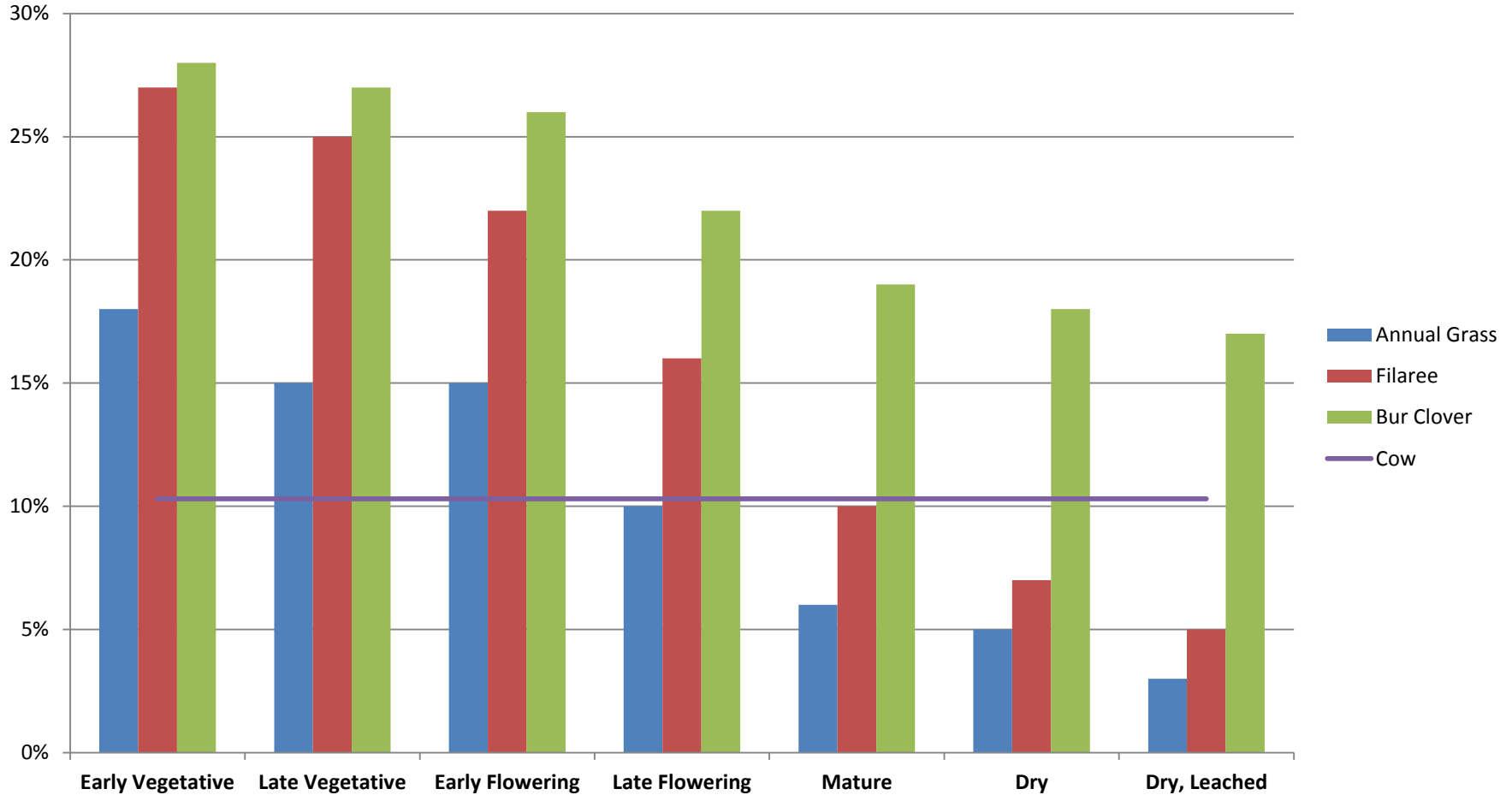


Increased protein, increased palatability, early green-up, altered forage window.

Increases forbs = important for CA protein req.



Cow Lactating 1st 90 days – CP%



Fire for the rangeland ecosystem

- Ungulate forage value
- Increased forbs
- Pollinator response
- Fight against encroachment
- Healthy acorn crop
 - (F. Lake 2013)
- Weed control (?)



Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
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Natives & forage

Growth

Senescence



Medusahead, goatgrass, starthistle



Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
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Natives & forage

Growth

Senescence



Medusahead, goatgrass, starthistle



Late
Phenology
Invasive

Late-season annual weeds



Photos by: Guy Kyser





Photo Credit: Guy Kyser

Medusahead



Burn Note

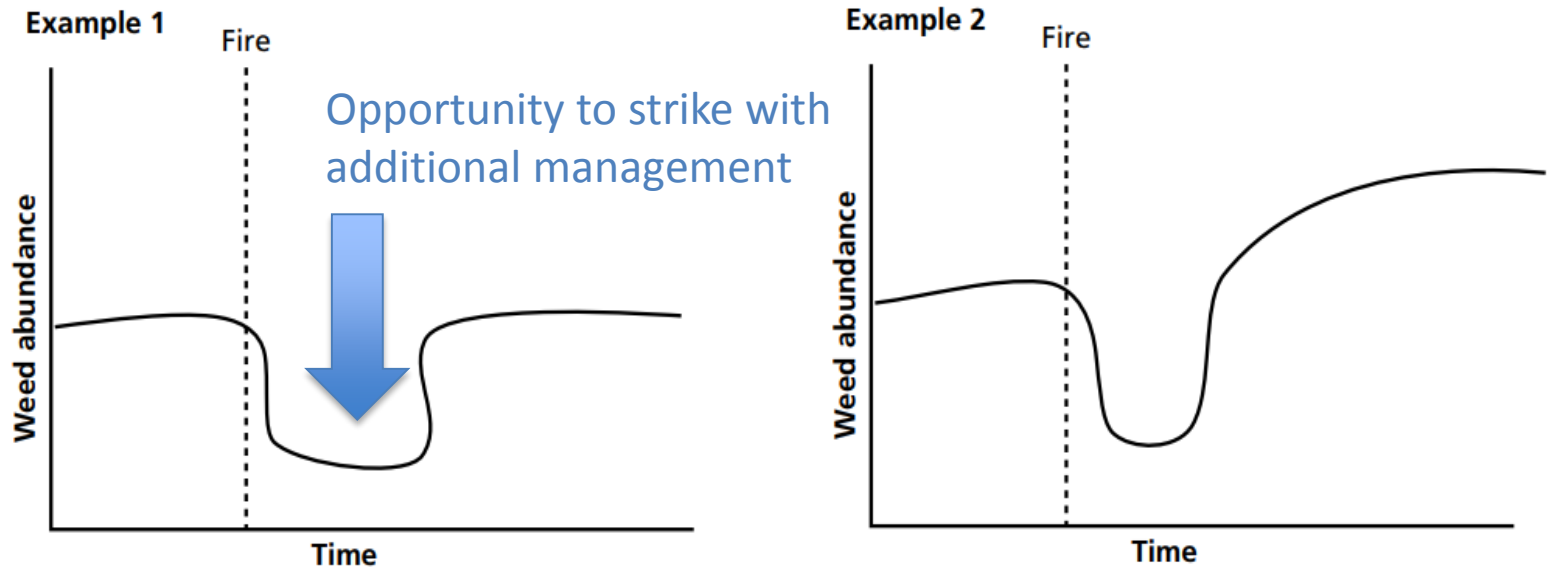
Josh Davy (UCCE-Tehama County)

- 1,800 lbs of production to 900 lbs.
- 79% medusahead to 3.6% in year 2 after single burn.
- Only lasts about 4 years.



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.

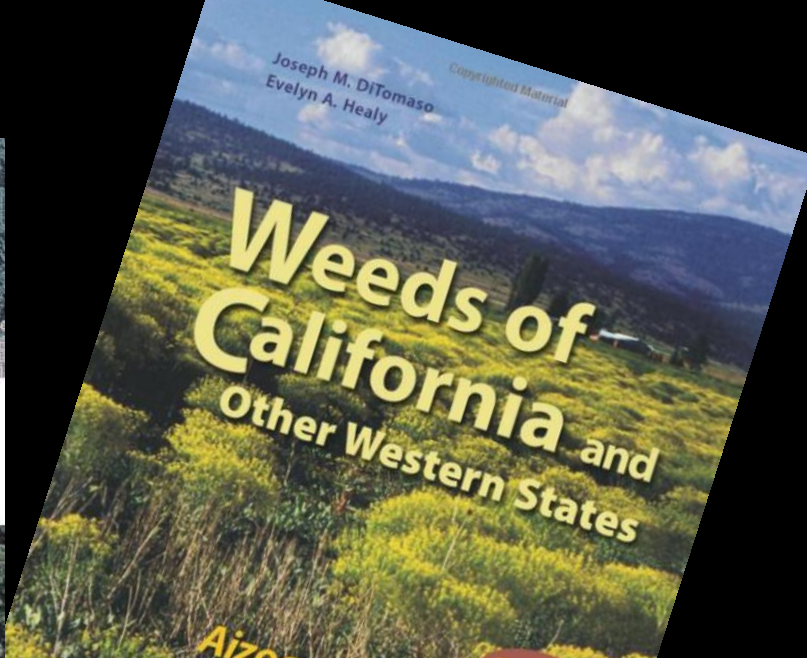
(B) Post-fire short-term decrease (control opportunity):
weakened in the short-term abundance will remain the same or increase slowly in the longer term





Weed Control in Natural Areas in the Western United States

Weed Research & Information Center • University of California



Yellow Starthistle Management Guide



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Medusahead Management Guide for the Western States

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Using Grazers to Change Fire Behavior

- How?
- Mosaic burn patterns
- Different grazers alter different fuels
 - Goats
 - Sheep
 - Cattle
 - Horses
- Fire can alter livestock use patterns.
 - Location & Forage Choices



Berries burn much better once compacted by snow or livestock...





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Grazing does not always need to be differed when planning an Rx fire... it depends on objectives.

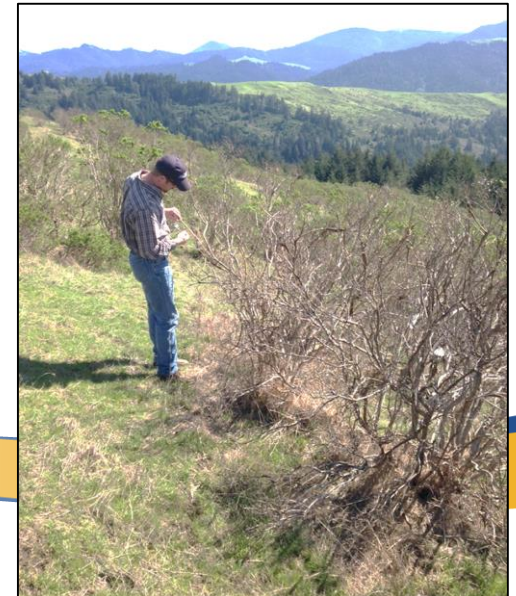
Fire's Competition

- Chemical applications are cheaper
- Fire culture is gone from California
- Subsidies for hiring crews to clear brush may be more easily obtained for landowners than private Rx burning.
 - Liability gets cloudy
 - CA society is scared of fire

Chemical Alternative

- Pros:
 - Cheap
 - Relatively easy (1 person)
 - Reduces resprouting
 - Can have residual
 - Retain RDM
- Cons:
 - Need to make the right match
 - Still have a mess afterwards (woody)
 - Scale

Weather dependent.
(Neighbors will hate you no matter what you do...)



Chemical Treatment Costs

Broadleaf-Herbaceous Plants

- Shark @ 1 and 2 oz/acre
 - ~\$6/oz = \$6 to \$12/acre
- Milestone @ 3 and 7 oz/acre
 - ~\$2.90/oz = \$8.5 to \$20/acre
- Transline @ 3 and 7 oz/acre
 - ~\$1.47/oz = \$4.5 to \$10.5/acre
- 2, 4-D @ 32 and 64 oz/acre
 - ~\$0.15/oz = \$4.5 to \$9/acre
- Triclopyr @ 32 and 64 oz/acre
 - ~\$0.50/oz = \$16 to \$32/acre
- Crossbow @ 64 and 128 oz/acre
 - ~\$0.48/oz = \$31 to \$62/acre

Woody Plants

- 2,4-D @ \$16.67/gal
 - Spray (47 gal*5%)= ~\$39.17/acre
- Triclopyr @ \$54.82/gal
 - Spray (47 gal*5%)= ~\$128.83/acre
- Imazapyr @ \$49.10/gal
 - Spray (47 gal*5%)= ~\$115.38/acre
- Glyphosate @ \$31.64/gal
 - Spray (47 gal*5%)= ~\$74.35/acre

Grass Only

- Poast @ 16 to 24 oz/acre
 - ~\$0.78/oz = \$13 to \$19/acre

Mechanical Alternative

- Cat: \$85/hr (\$340/acre)
- Hired Saw: \$15/hr (\$487/acre)
- Excavator: \$125/hr (\$975/acre)



Mostly independent of weather

Table 1: LSD mean frequency and cover reduction of *Baccharis* and bare ground by treatment

Treatment	Plants/M ²	<i>Baccharis</i> reduction, %	Bare ground, %
Exc	0.07 ^{a1}	68b	22b
Cat	0.45 ^a	65b	19b
Saw	1.32 ^b	53a	3a

¹Within a column means with a similar letter do not differ



Fire Costs

- Per-acre planning costs vary: operational efficiency, unit size and shape, fuel types, fire boss preferences, etc. (Cleaves et al. 2000)
- Unit size is one of the most important factors used in calculating per-acre costs (Gonzalez-Caban and McKetta 1986, Rideout and Omi 1995, Cleaves et al. 2000)
- Economies of scale can come at an infrastructure cost (fencing, pipe, etc.)
 - Acres are a poor metric to measure Rx fire cost

HumCo #1

- Hunt: June 29th
 - 18 acres: Medusahead
 - \$500: Burn Plan
 - \$1500: Burn Boss
 - \$600: VFD Stipends
 - \$100: Air Quality + other
 - \$150/acre
- Mazzeppa: October 31st
 - 140 acres: Coyote Brush
 - \$500: Burn Plan
 - \$1000: Burn Boss
 - \$200: Air Quality + other
 - \$12/acre

HumCo #2

- Chalk Mt: Dec 14th
 - 20 acres: Restored Oak Woodland
 - No Burn Plan
 - No Burn Boss
 - \$100: Air Quality + other
 - \$5/acre
- Rice: Dec 17th
 - 15 acres: Restored Oak Woodland
 - No Burn Plan
 - No Burn Boss
 - \$100: Air Quality + other
 - \$7/acre

HumCo #3

- 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

Final thoughts:



- Rx Fire is compatible with rangelands and livestock production.
 - Branding culture already exists
 - Ranchers value wildlife
- Bigger the burn, cheaper the costs, we can beat the herbicide costs with fire on larger acreages.
 - Ranchers don't count their time as cost

Questions?

Solutions for California

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