

UCDAVIS

*Russell L. Rustici Rangeland & Cattle
Research Endowment*

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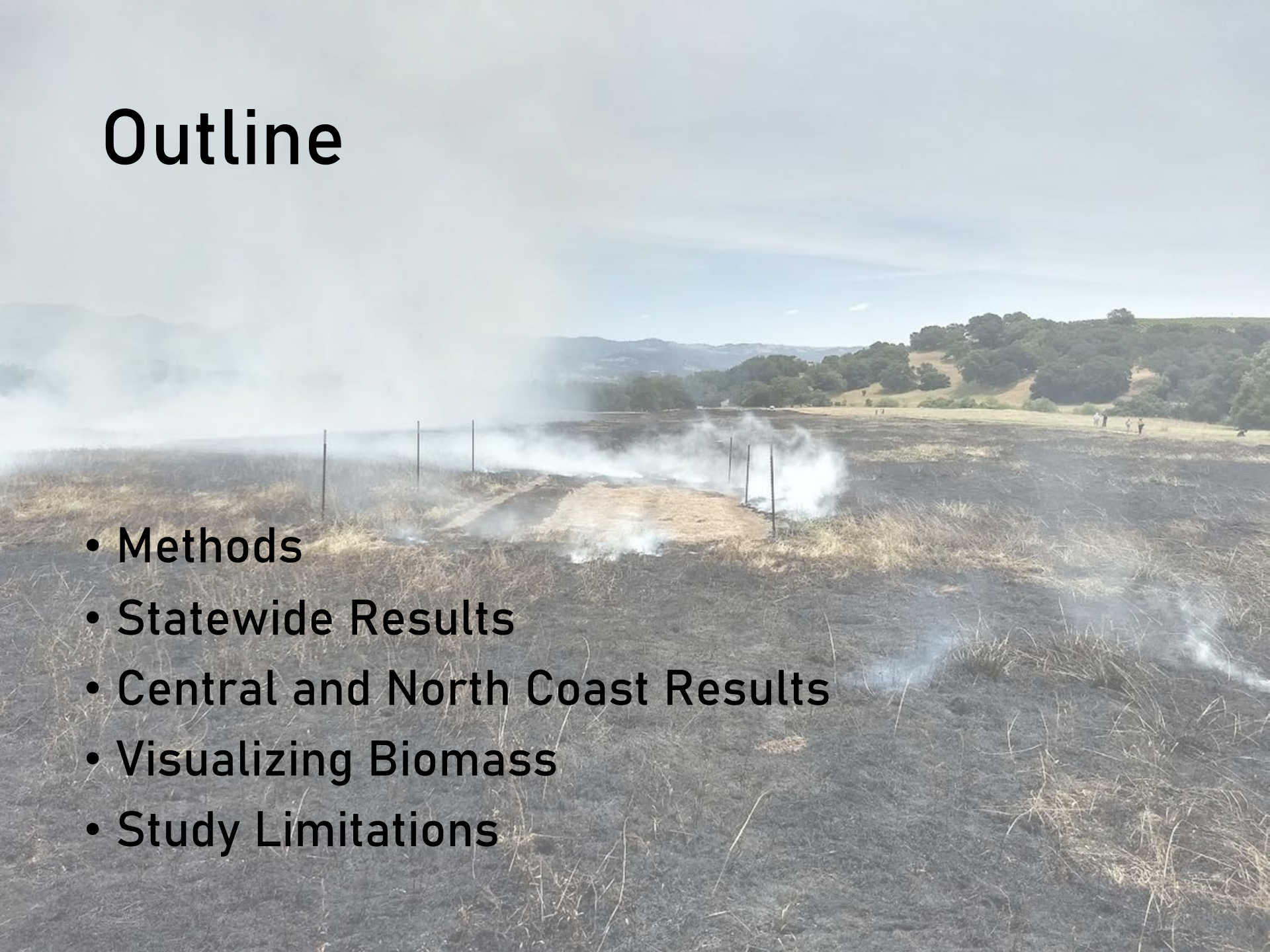
How much to graze to reduce fire hazards



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Outline

- **Methods**
- **Statewide Results**
- **Central and North Coast Results**
- **Visualizing Biomass**
- **Study Limitations**



Methods







**>2,000 lbs/acre
Untreated**

1,250 lbs/acre

750 lbs/acre

250 lbs/acre



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Untreated**

1,250 lbs/acre

750 lbs/acre

250 lbs/acre

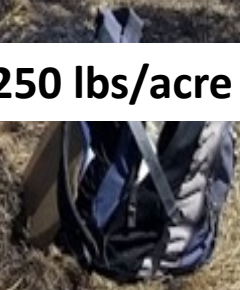


**>2,000 lbs/acre
Untreated**

1,250 lbs/acre

750 lbs/acre

250 lbs/acre

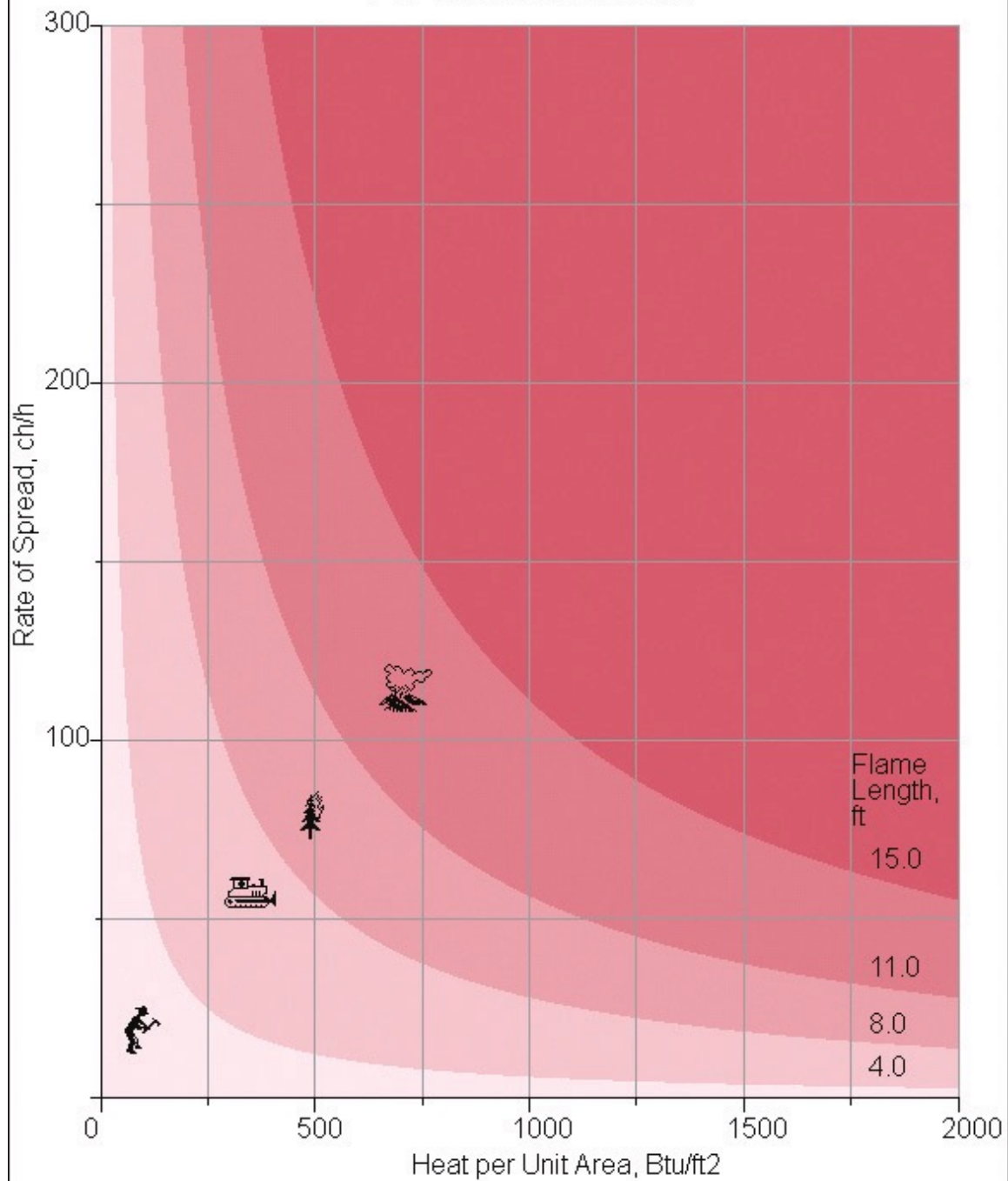


Parameters

Stratification Variables	Weather Variables	Dependent Variables
<ul style="list-style-type: none">• Treatment (Biomass)• Slope• Vegetation Zone	<ul style="list-style-type: none">• Temperature• Relative humidity• Wind speed	<ul style="list-style-type: none">• Flame height• Passing 10m• Cover of burned vegetation, ash, etc.• Rate of spread• Surface temperature

SURFACE FIRE BEHAVIOR

Fire Characteristics Chart

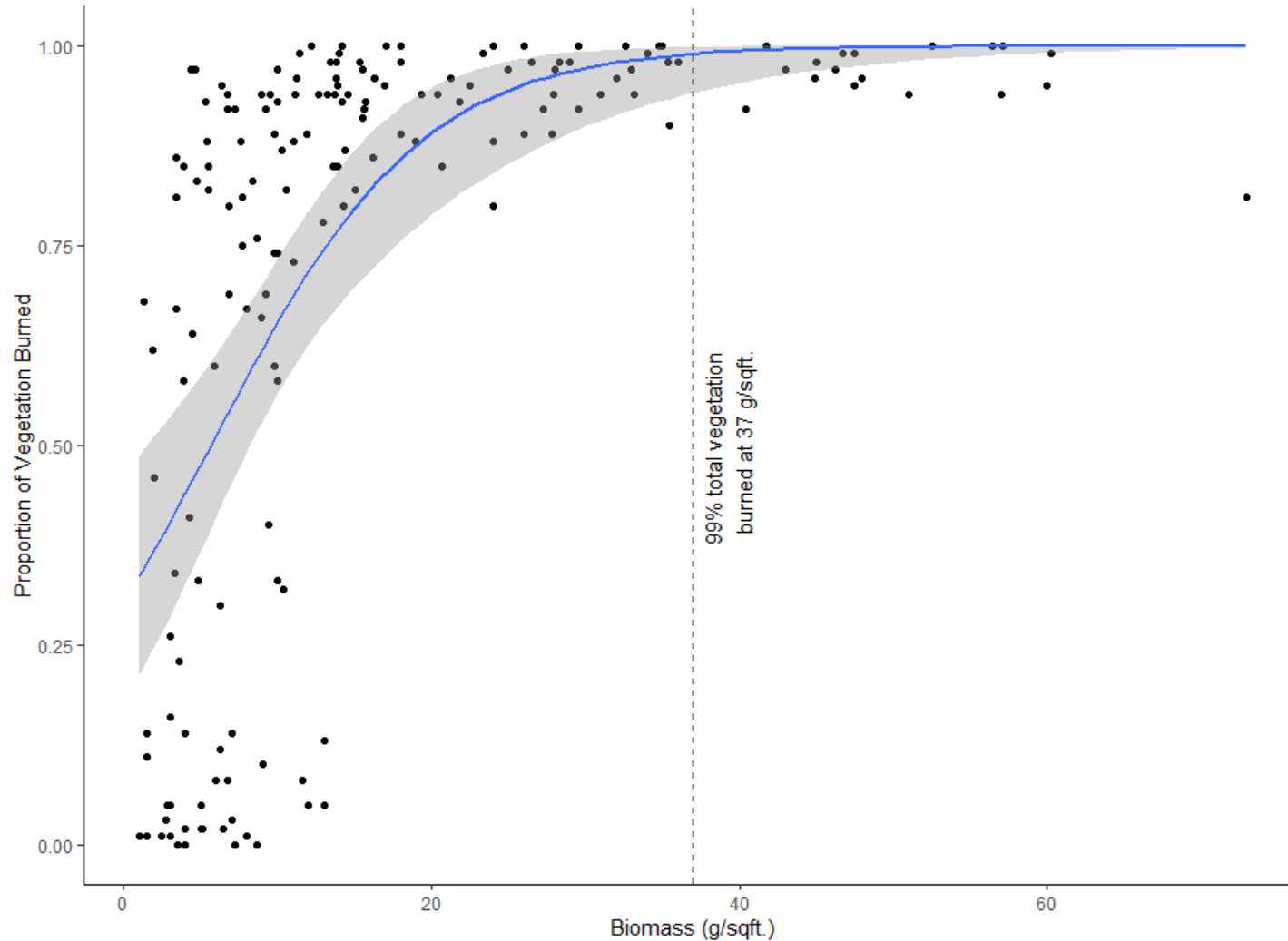


Statewide Results

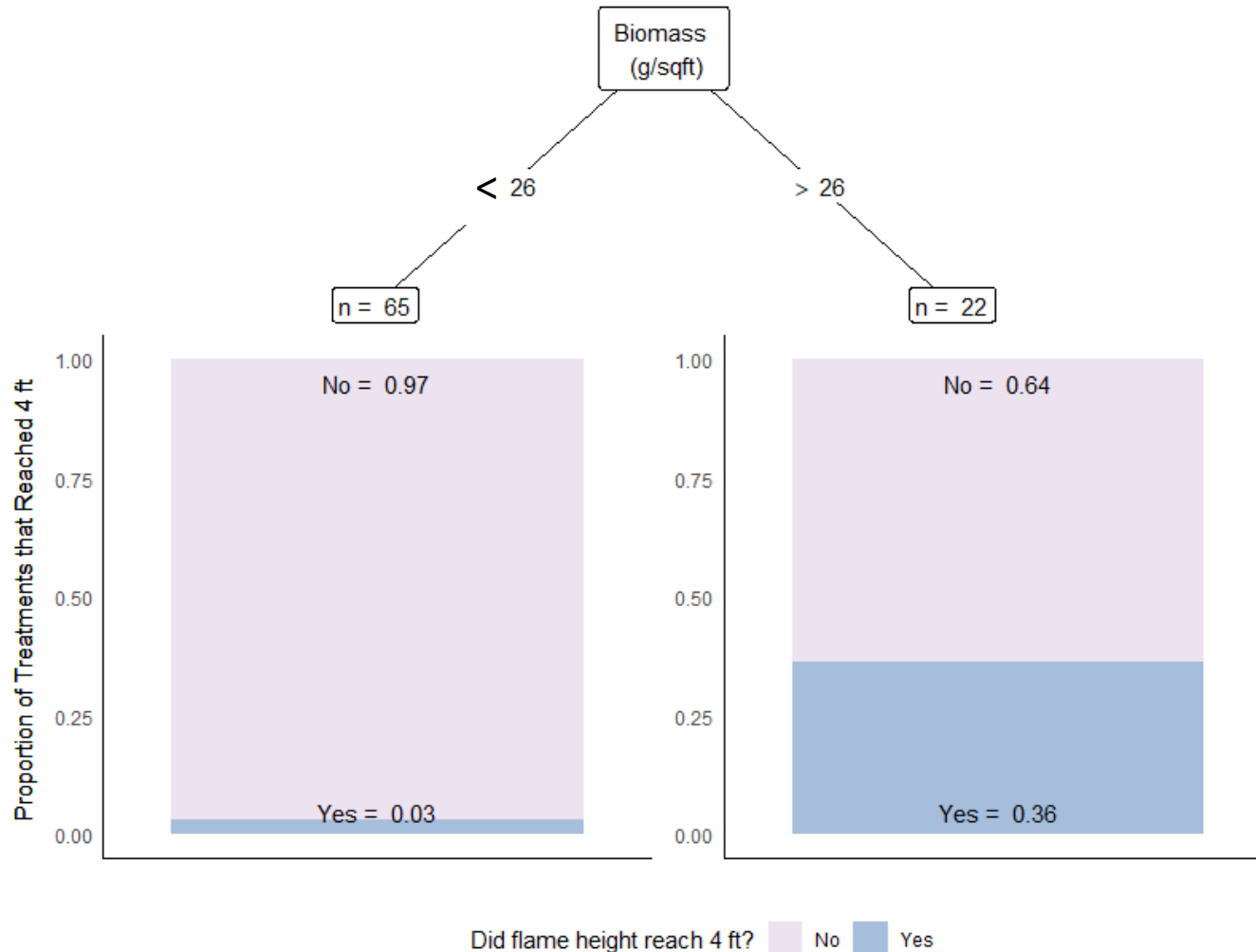




Statewide: Managing for more than 3,500 lbs/acre increases likelihood to burn entire area.

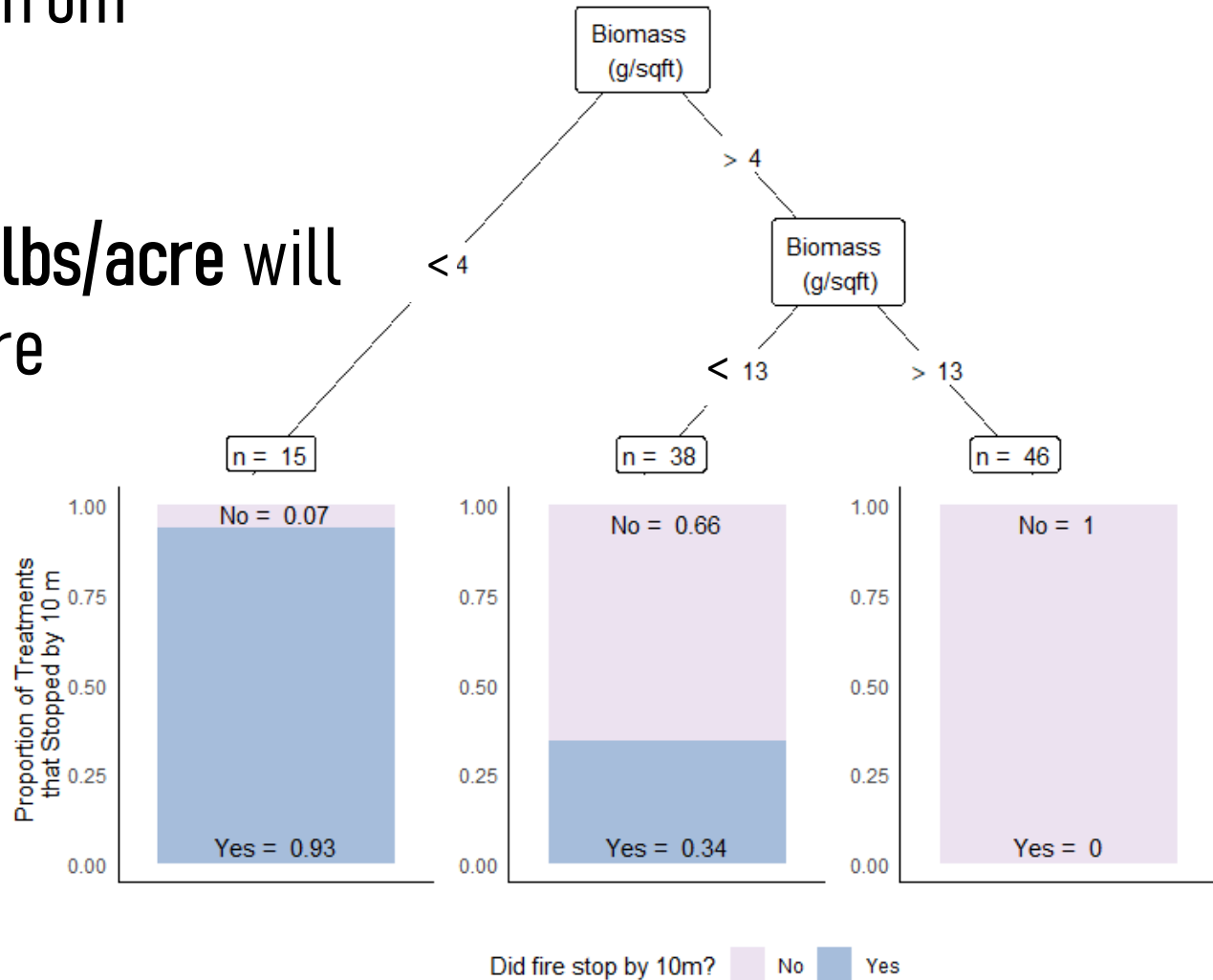


Statewide: Pastures with less than 2,500 lbs/acre keep flames below critical 4 feet height.



Statewide: Pastures with more than 1,250 lbs/acre will *not* stop a fire from spreading.

Less than 400 lbs/acre will likely stop a fire



Statewide Pasture Management

Biomass Range (lbs/acre)	Grazing Level	Potential Fire Behavior
>3,500	Ungrazed	Likely flame heights above 4 ft and all biomass is burned
3,500 to 2,500	Ungrazed or very light	Possible flames above 4 ft and majority burned
2,500 to 1,250	Light to moderate	Flames likely below 4 ft, fire will not be stopped, and majority burned
1,250 to 400	Moderate to heavy	Flames below 4 ft and fire may be stopped
<400	Very heavy	Flames below 4 ft and highly likely fire stopped

Table 1. Minimum RDM standards for dry annual grassland in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	300	400	500	600
25–50	300	400	500	600
50–75	NA	NA	NA	NA
75–100	NA	NA	NA	NA

Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

Table 2. Minimum RDM standards for annual grassland/hardwood rangeland in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	500	600	700	800
25–50	400	500	600	700
50–75	200	300	400	500
75–100	100	200	250	300

Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

Table 3. Minimum RDM standards for coastal prairie in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	1,200	1,500	1,800	2,100
25–50	800	1,000	1,200	1,400
50–75	400	500	600	700
75–100	200	250	300	350

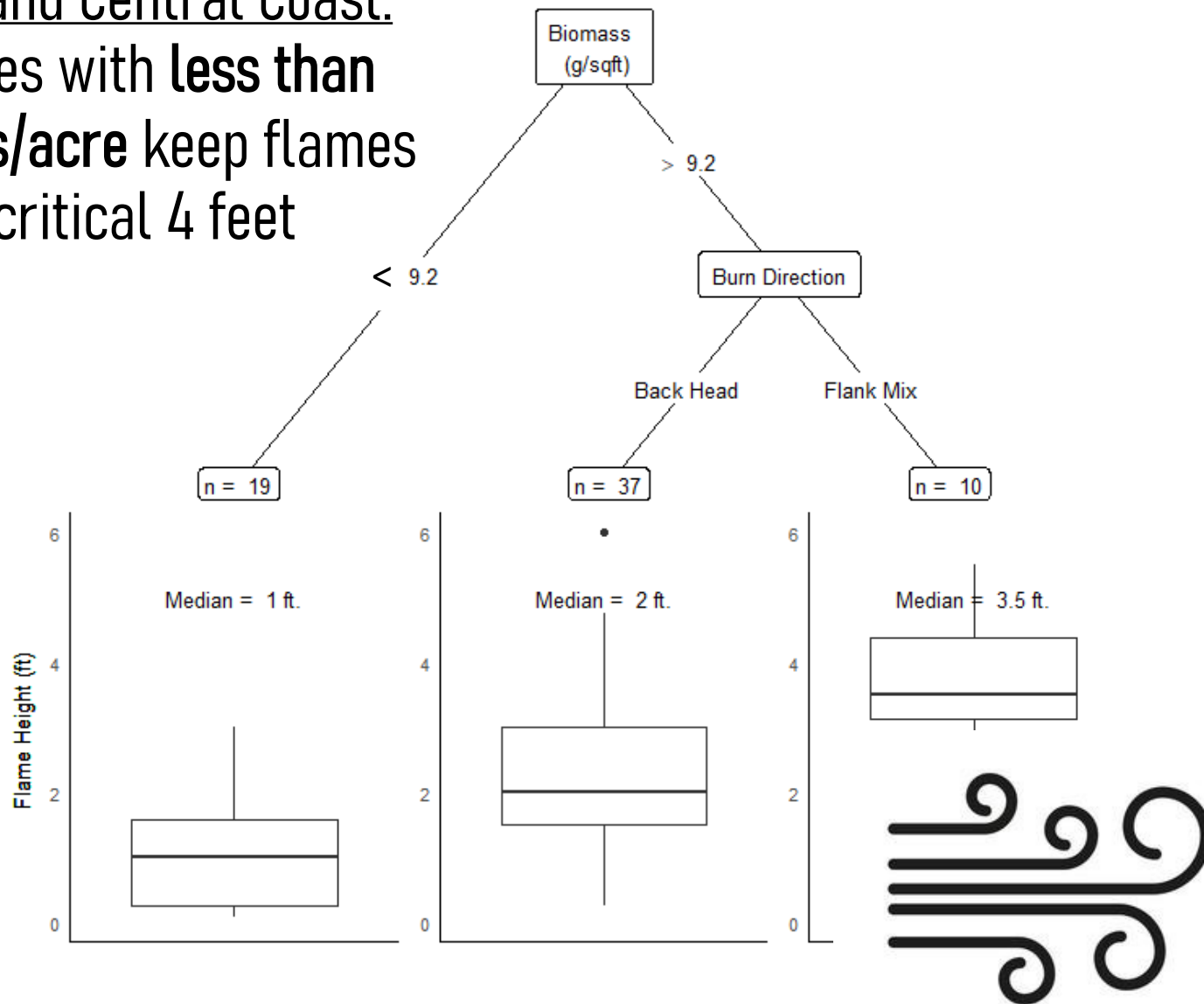
Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

North and Central Coast Results

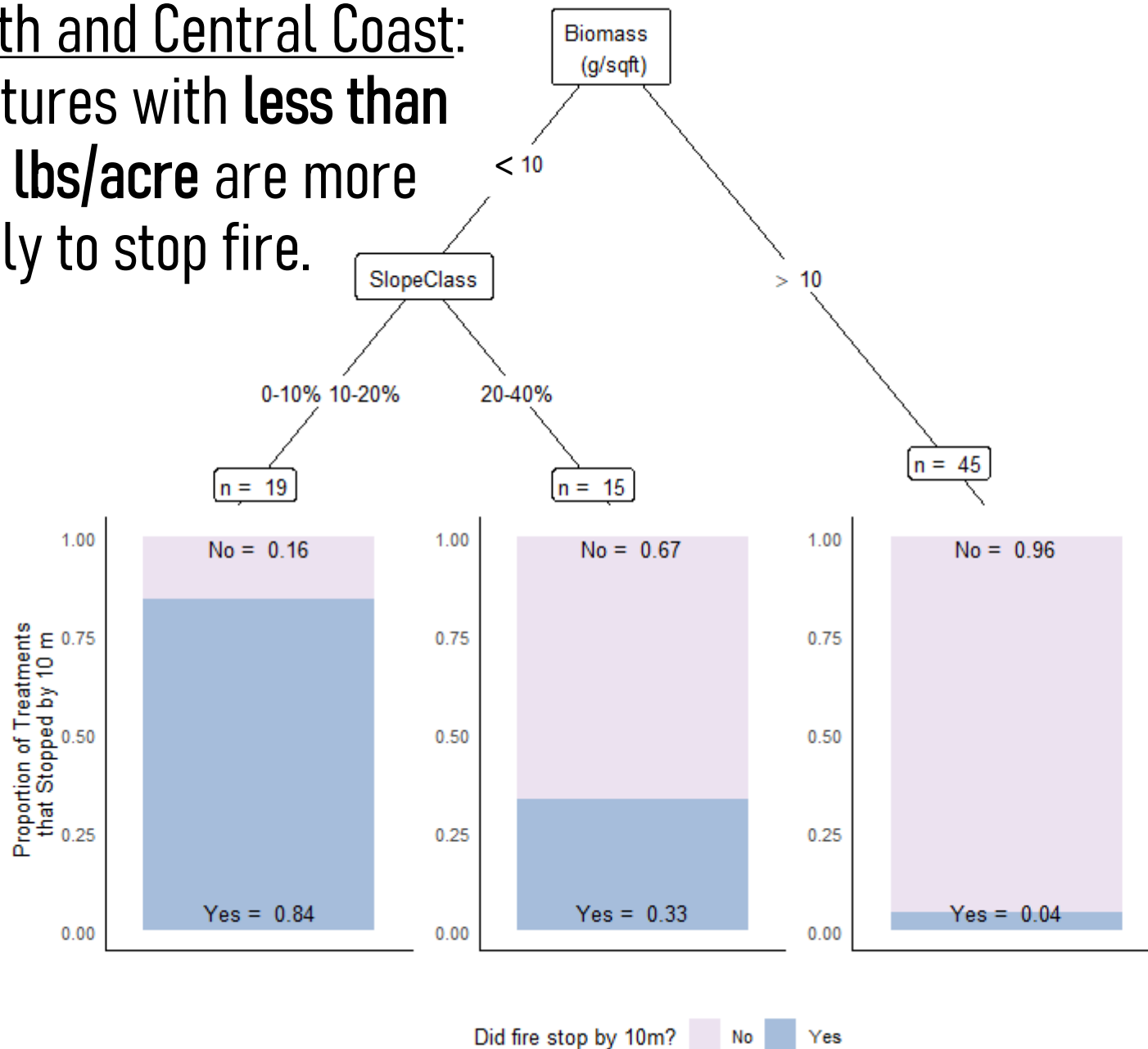




North and Central Coast:
Pastures with **less than 880 lbs/acre** keep flames below critical 4 feet height.



North and Central Coast:
Pastures with **less than 960 lbs/acre** are more likely to stop fire.



North and Central Coast Pasture Management

Biomass Range (lbs/acre)	Grazing Level	Potential Fire Behavior
>3,850	Ungrazed	Likely flame heights above 4 ft and all biomass is burned
3,850 to 900	Ungrazed to moderate	Likely flame heights are above 4 ft in high/gusty wind and fire will <i>not</i> be stopped.
<900	Moderate to heavy	Flame heights below 4 feet and fire likely stopped on slopes below 20% and a have a chance of stopping on slopes above 20%

Table 1. Minimum RDM standards for dry annual grassland in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	300	400	500	600
25–50	300	400	500	600
50–75	NA	NA	NA	NA
75–100	NA	NA	NA	NA

Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

Table 2. Minimum RDM standards for annual grassland/hardwood rangeland in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	500	600	700	800
25–50	400	500	600	700
50–75	200	300	400	500
75–100	100	200	250	300

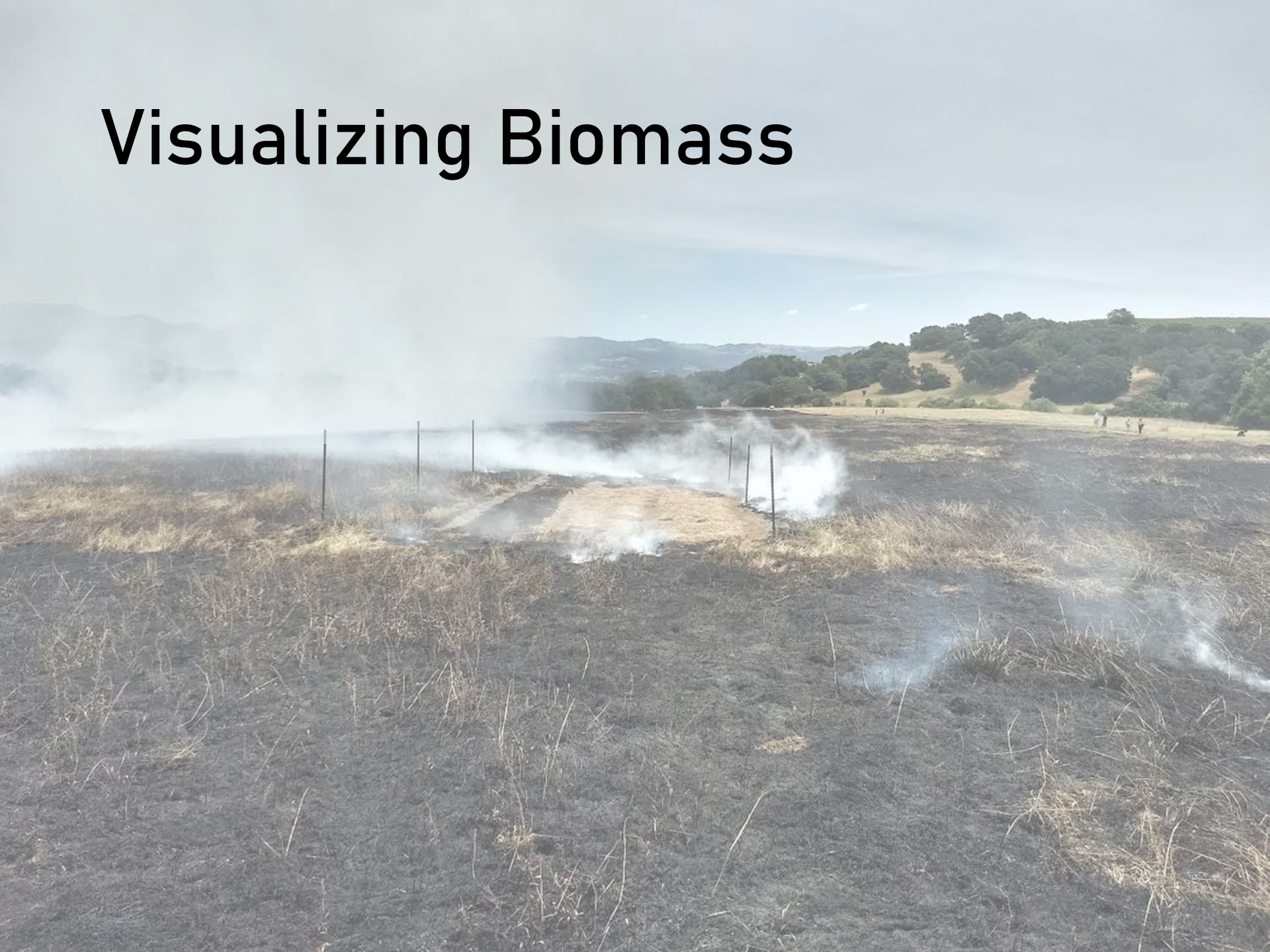
Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

Table 3. Minimum RDM standards for coastal prairie in pounds per acre (dry weight)

Woody cover (%)	RDM standard for percent slope (lb/acre)			
	0–10	10–20	20–40	>40
0–25	1,200	1,500	1,800	2,100
25–50	800	1,000	1,200	1,400
50–75	400	500	600	700
75–100	200	250	300	350

Note: Metric conversion: 1 lb/acre = 1.12 kg/ha.

Visualizing Biomass



A circular wire mesh enclosure is set up in a field of tall, dry, golden-brown grass. The enclosure is made of several concentric rings of wire mesh supported by vertical posts. The background shows a rolling landscape with scattered trees and a clear sky.

**Ungrazed
(more than 3,500 lbs/acre)**

Santa Barbara County: 6,258 lbs

Ungrazed or very lightly grazed
(3,500 to 2,500 lbs/acre)

Los Alamos
10/30/20 RDH
Plot 1

Santa Barbara County: 3,140 lbs/acre



**Light to moderate grazing
(2,500 to 1,250 lbs/acre)**

Contra Costa County: 1,918 lbs/acre

**Moderate to heavy grazing
(1,250 to 400 lbs/acre)**



Quercus Phellos
11/1/10 10:00
Plot 3

Ventura County: 1,160 lb

**Very heavy grazing
(under 400 lbs/acre)**

San Joaquin County: (315 lbs/acre)

Study Limitations



Caveats and Future Research

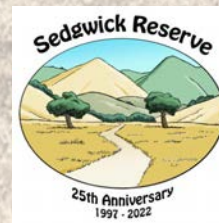
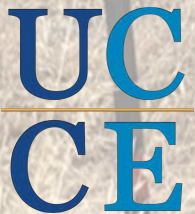
- Prescribed fire vs. wildfire
- Mowed vs. grazed
- Small plots vs. large areas
- Overrepresentation of annual grass/hardwood
- Other management goals should be considered



Acknowledgements

Russell L. Rustici Rangeland and Cattle
Research Endowment

Matthew Shapero, Shane Dewees, Luke
Macaulay, Lenya Quinn-Davidson, Jeff
Stackhouse, Jared Childress, Joe
Restaino, Brian Mattos, field crews, and
landowners



North Coast (summer) burns had higher flame heights at lower biomass levels

