

Replacing non-native grasses with herbaceous native plants to reduce ignition potential of fuel breaks and roadsides

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Acknowledgements

Thesis Committee

- Carla D'Antonio
- Nicole Molinari
- Claudia Tyler
- Max Moritz
- Hilary Young

UCSB Support

- Cameron Hannah-Bick
- Jack Betz, Allison Lane, Emily Thomas
- Ryan Fass
- Zara Furtado-Quesenberry

Undergraduate Volunteers/Interns

Alicia Magliato*, Victor Briones*, Lauren Harris*, Casey Chen, Dana Sprague, Jasmine Denny, Rachel Harris, Demitri De la Cruz, Jackie Liang, Quinn Giessow, Ruth Hamilton, Zoe Fung, Sarah Markle, Matt Christensen, Grace Benzler, John Costello, Steven Scruggs, Gavin Canann

* Received undergraduate funding

Land Acknowledgment: Ancestral Chumash Land

Funding:



Highly Disturbed Areas -> invaded by non-native plants



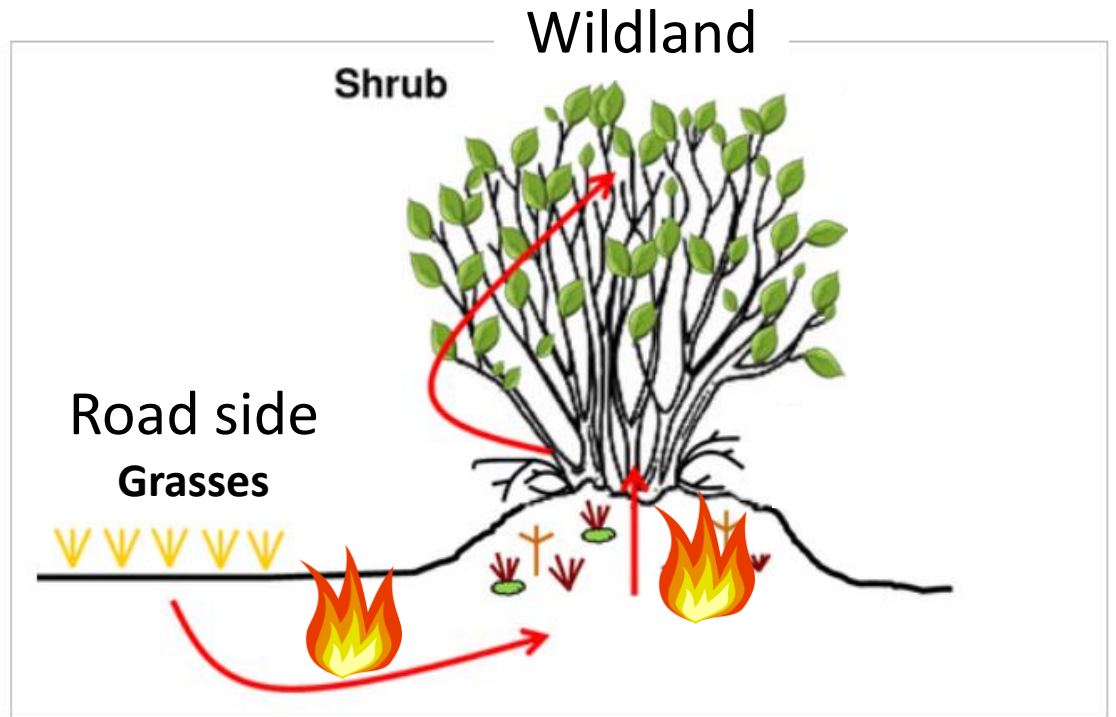
Fuel Break

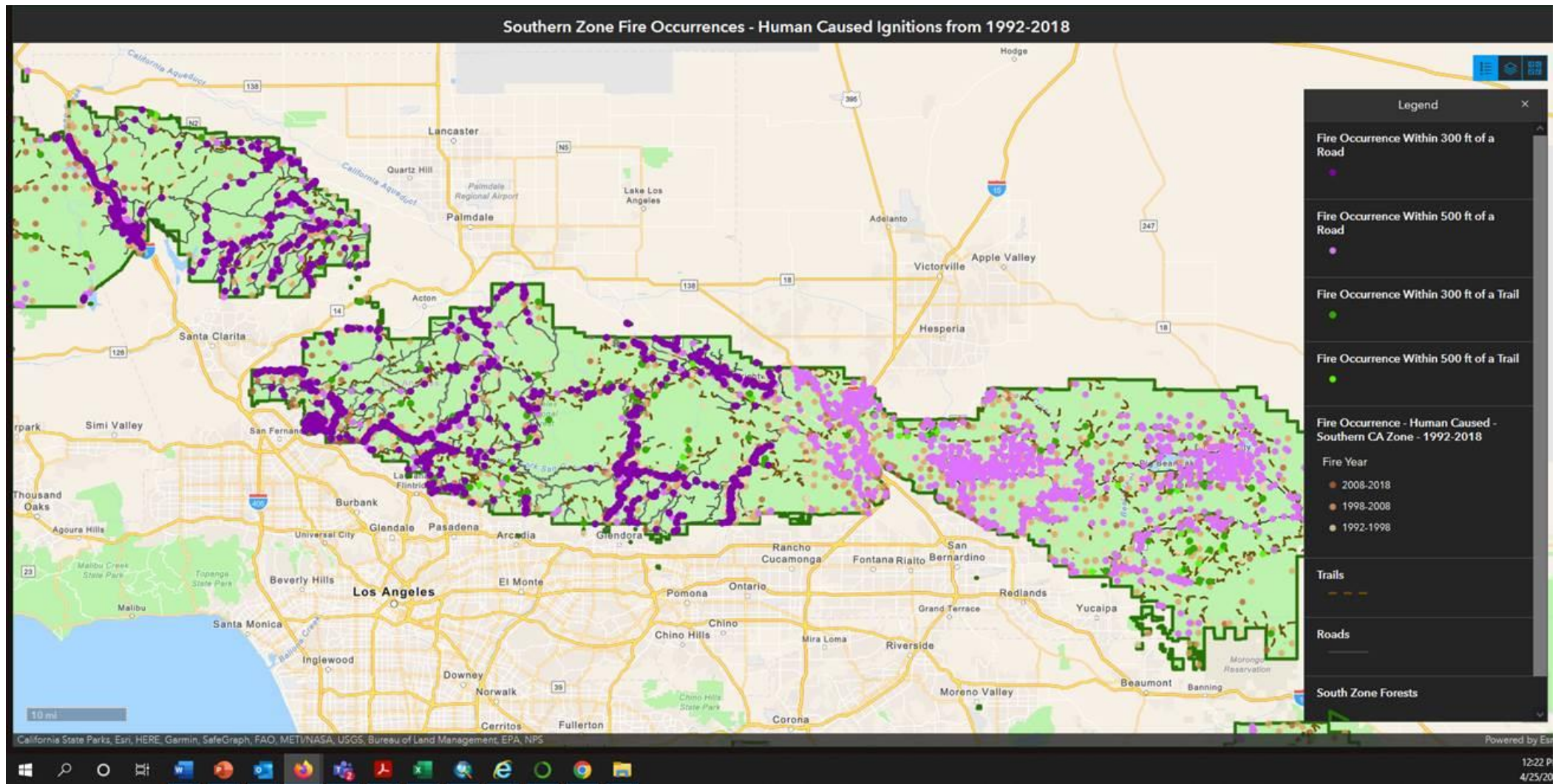


Road Side

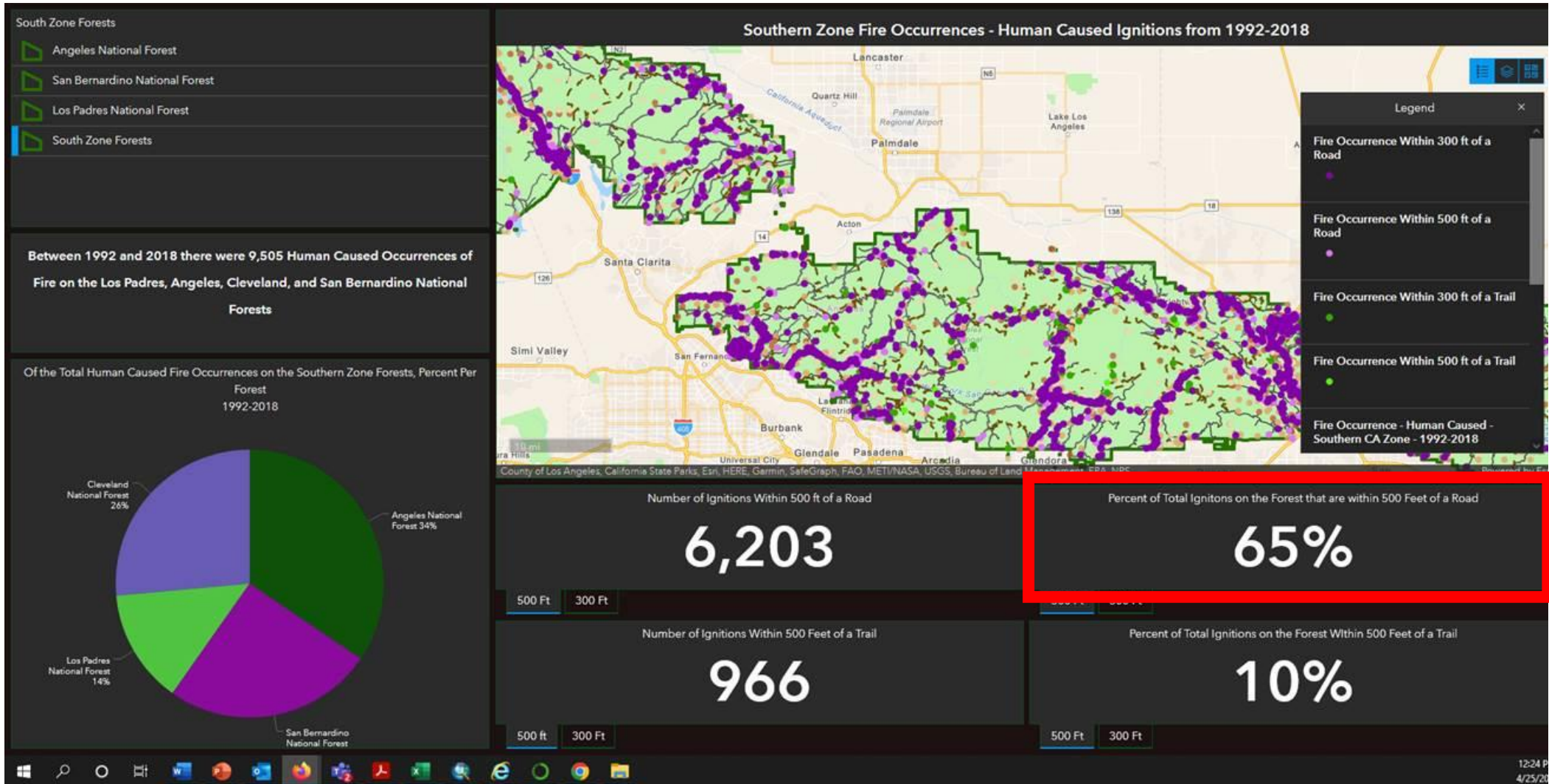
Contribution of invasive annual grasses to fires?

- Easily ignitable fuel
- Increase fuel continuity
- Expand the fire season





Provided by USFS, Forest Ignitions Data



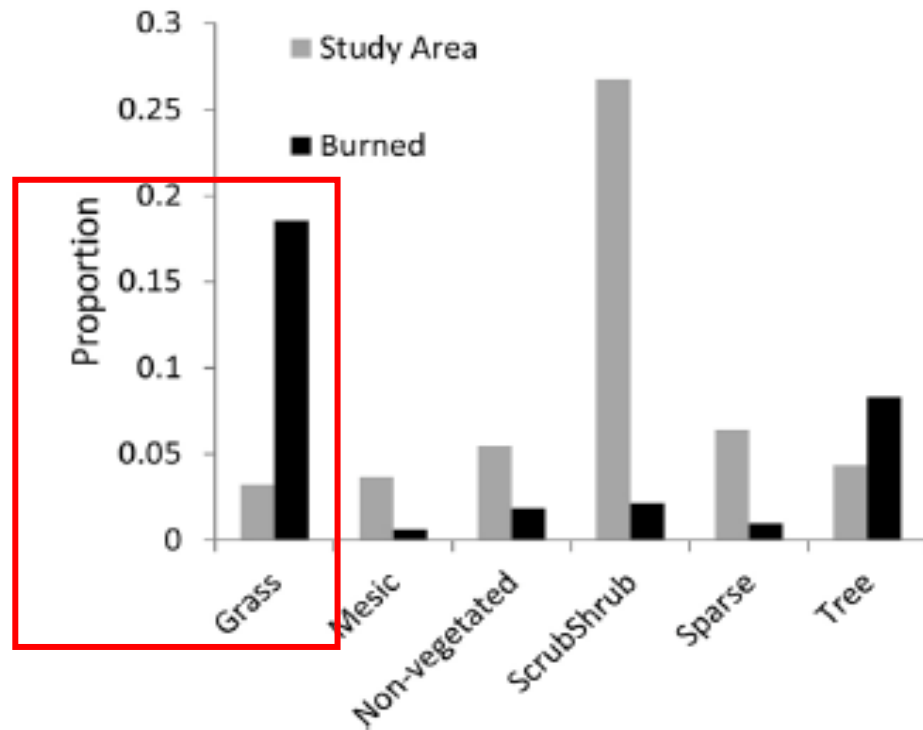


Fig. 5. Proportion of cover class in the study area and proportion of cover class burned by fire at least once from 1970 to 2010 in the Desert Renewable Energy Conservation Plan (DRECP) study region.

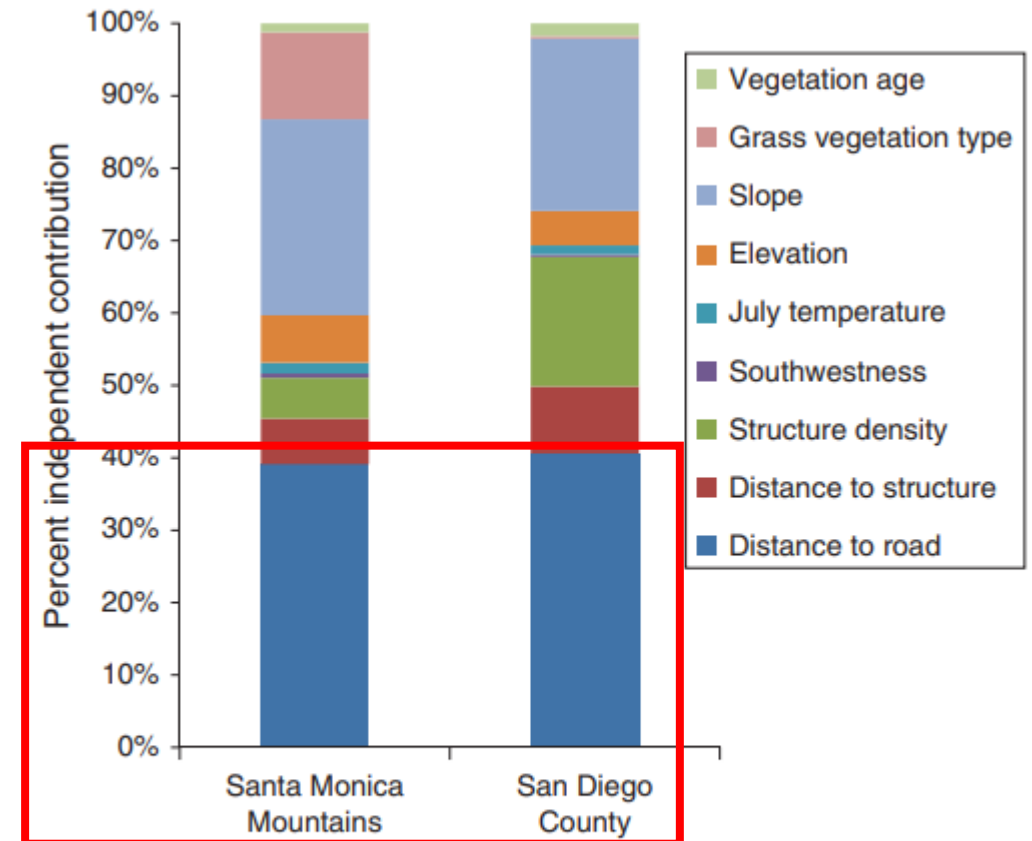


Fig. 4. Percent independent contribution of variables in hierarchical partitioning models explaining patterns of all ignitions in the Santa Monica Mountains and San Diego County.



**Grass dominated
and flammable**



**Use native species
to
reduce wildfire risk**

Desirable Species Traits?

Fuel / Fire

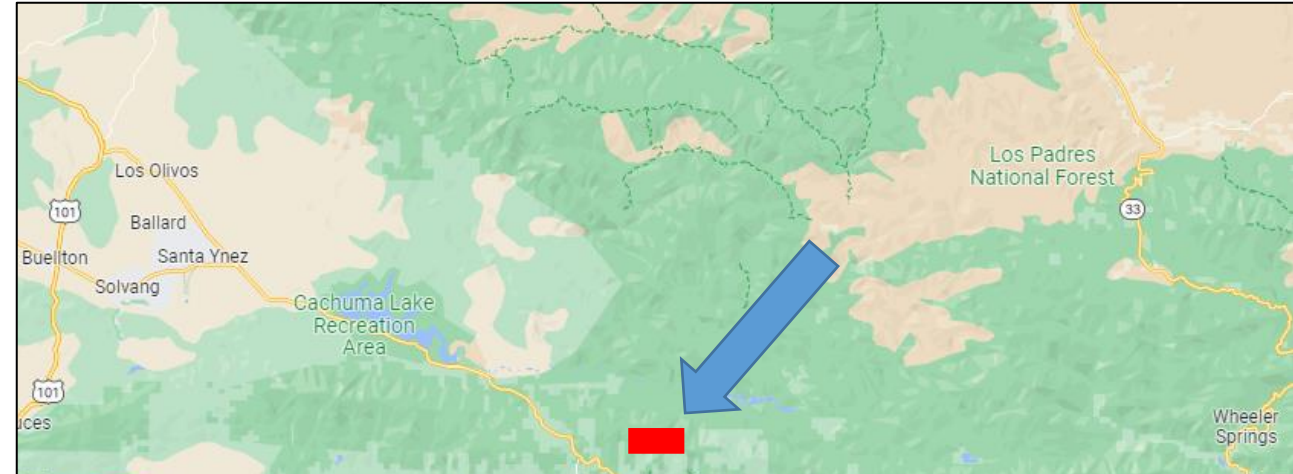
- High fuel moisture content
- Produces less litter
- Ratio of Live:Dead
- Shorter height
- Smaller fuel load

Central Question: How do native and non-native plants differ?

- Fuel (fire) characteristics
- Ecological traits

Study Location

- Restoration Project
- Los Padres National Forest
- Santa Barbara, CA
- 108, 1.25m x 1.25m plots



Plot Treatments

Out-planted

Perennial community

Asclepias eriocarpa
Asclepias fascicularis
Calystegia macrostegia
Eriophyllum confertiflorum
Melica imperfecta
Poa secunda
Mimulus aurantiacus
Pseudognaphalium californicum
Sisyrinchium bellum
Stipa pulchra

Seeded

Annual community

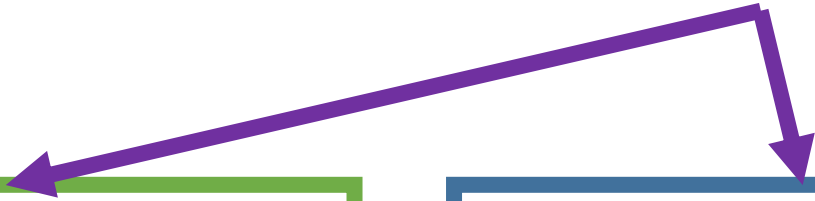
Amsinckia mensenzii
Clarkia unguiculata
Croton setger
Lupinus bicolor
Phacelia cicutaria
Salvia columbariae
Uropappus lindleyi

Current Vegetation **“Control”**

Avena barbata
Bromus diandrus
Centaurea solstitialis
Erodium cicutarium
Hirschfeldia incana

Plot Treatments

Weeded weekly, every year



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Annual community

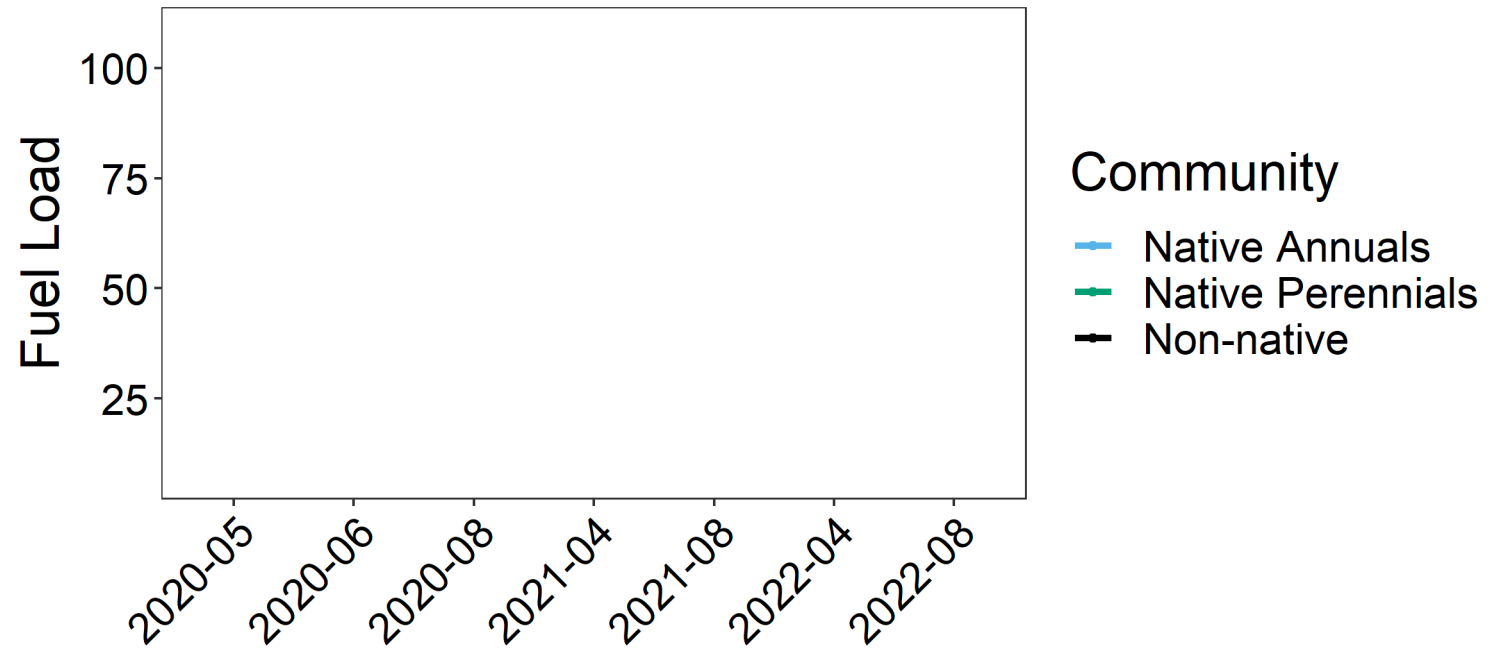
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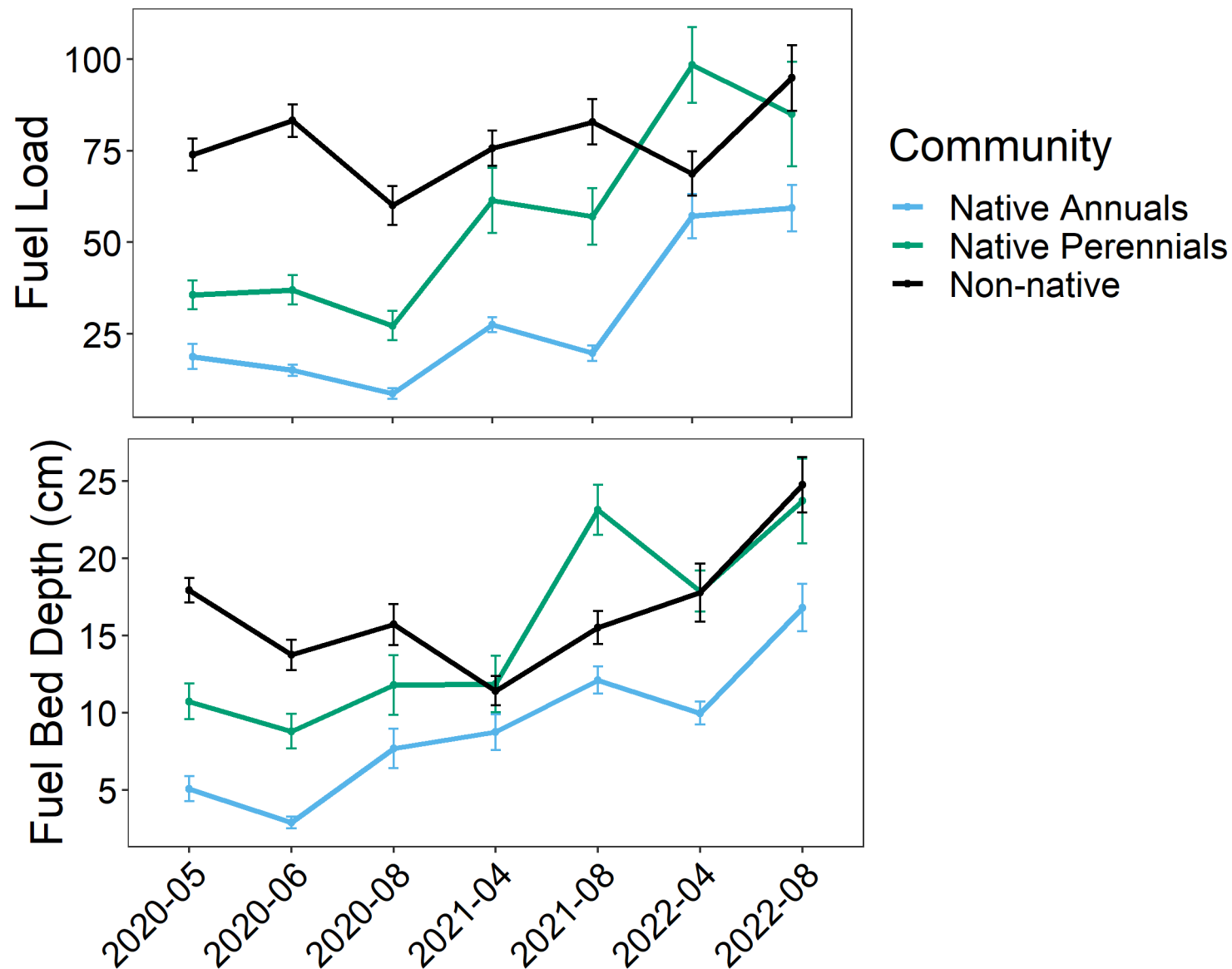




Summary:

By three years,

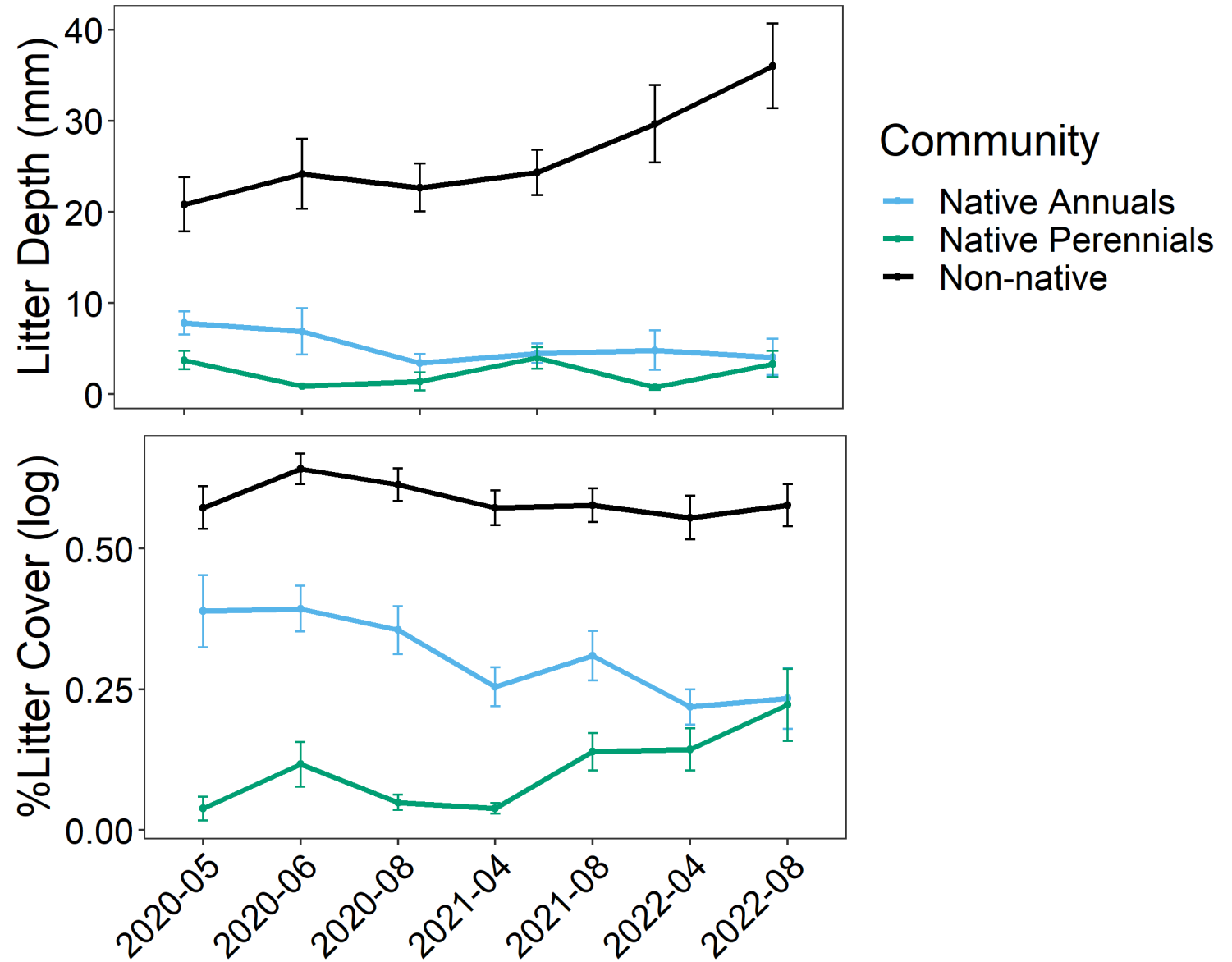
- **Native perennials and non-natives** were **EQUAL** in fuel load and height
- **Native annuals** are the **smallest**.



Summary:

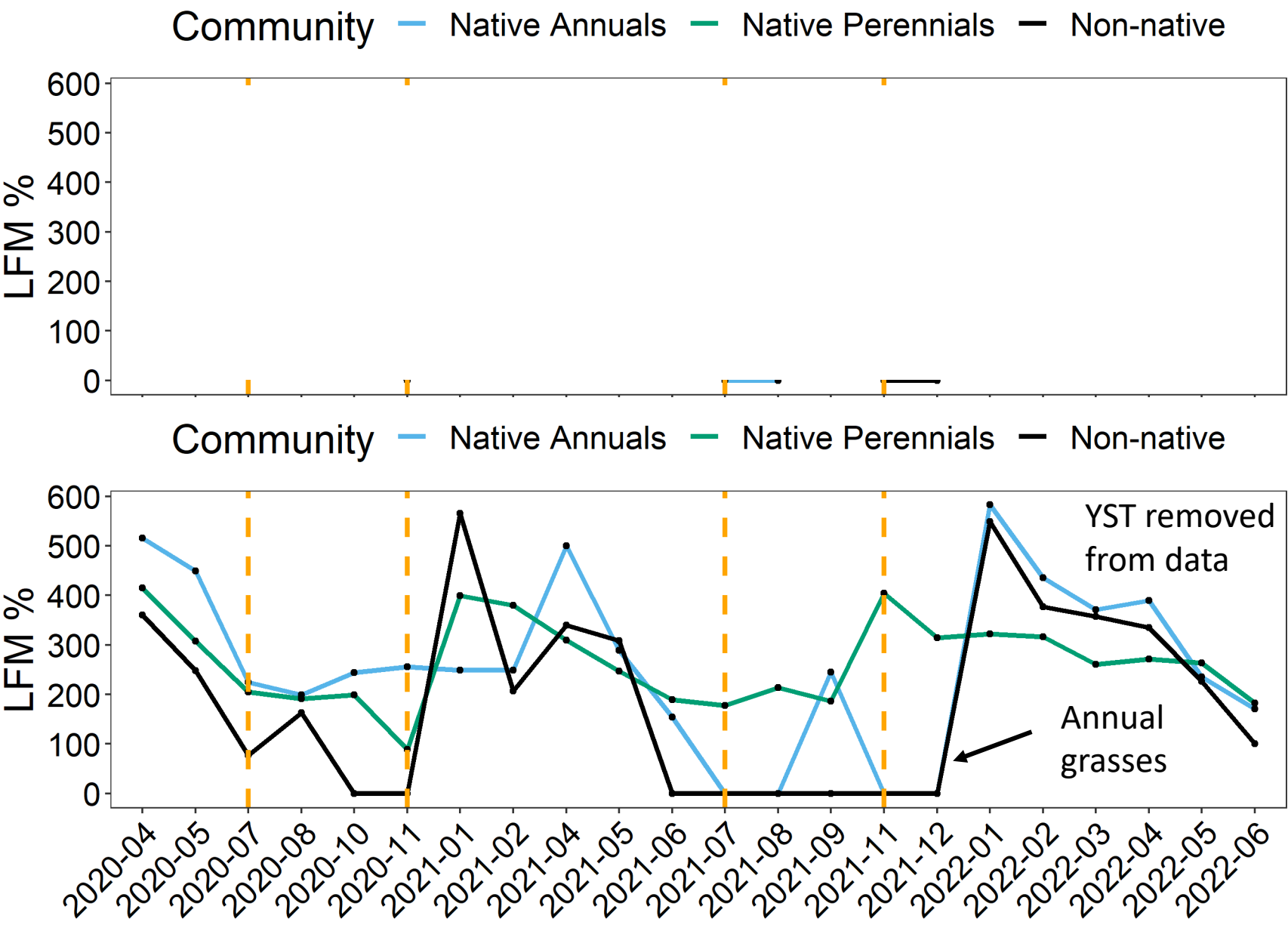
For **ALL** three years,

- **Non-native species, most litter cover and depth**
- Litter depth **did NOT** change for **native communities**



Summary:

- LFM is driven by fewer species as the summer drought progresses
- **Native communities** retain LFM for longer over summer
 - **6 months!**



Balance?- What changed?

TRAITS

Fuel / Fire

- Fuel moisture content
- Fuel load
- Litter
- Vegetation height

RESULT

 Native		vs	Non-native
High summer LFM			Low/dead
 Less Litter		Break even	
		Break even	Lots of litter

Wrap Up

Conclusions:

- Significant **benefits for reducing fire hazard** by having **herbaceous native species** in fuel modified habitats within the WUI
- Implications- fuel mod. projects should **prioritize greatly limiting** the amount of **annual non-native grasses** on the landscape in WUI

