



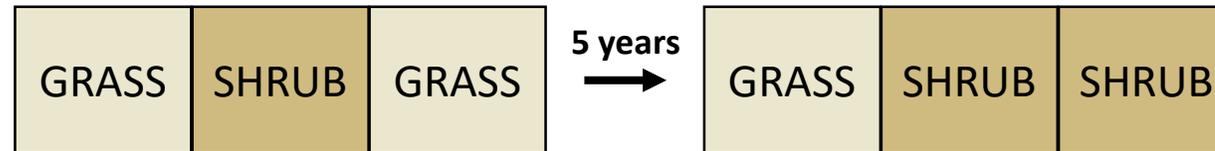
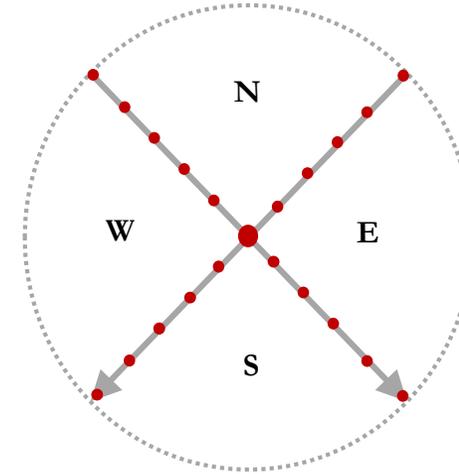
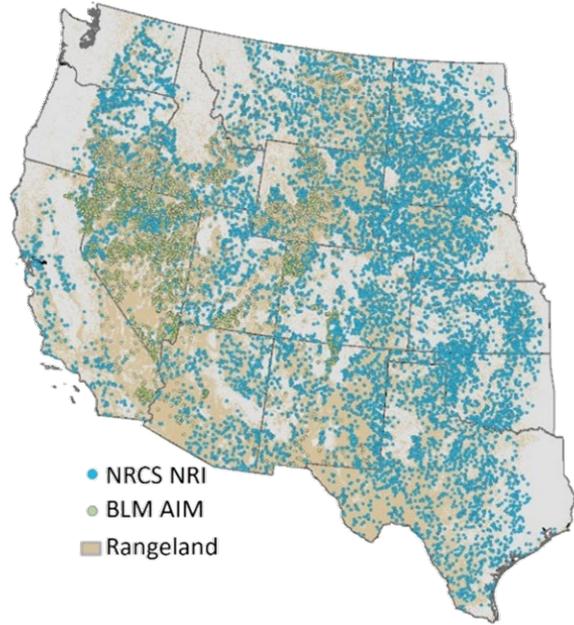
# Rangeland Analysis Platform (RAP): Demonstration and Applications for Idaho's Cheatgrass Challenge

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Matthew Jones, Research Scientist, University of Montana & WLFW, Missoula, MT

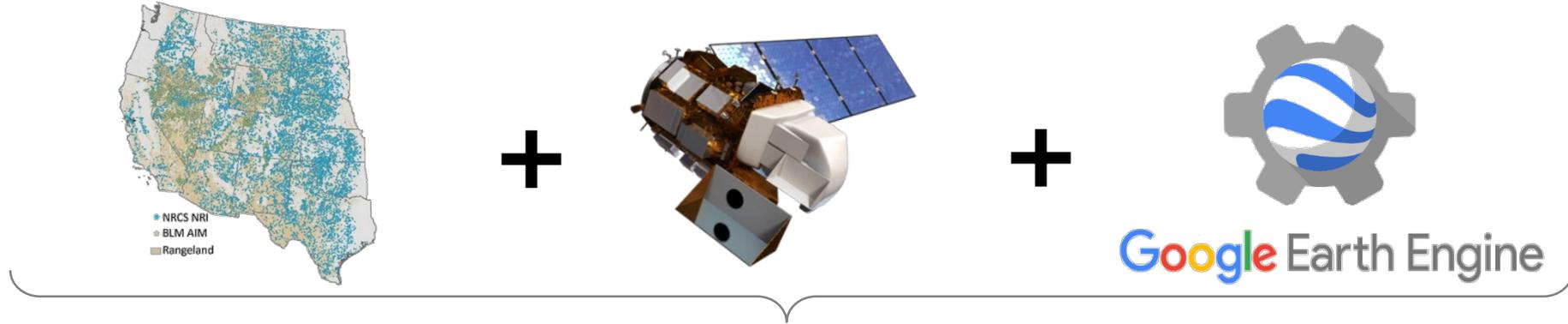
April 9, 2020



# Land cover variability not captured by past methods

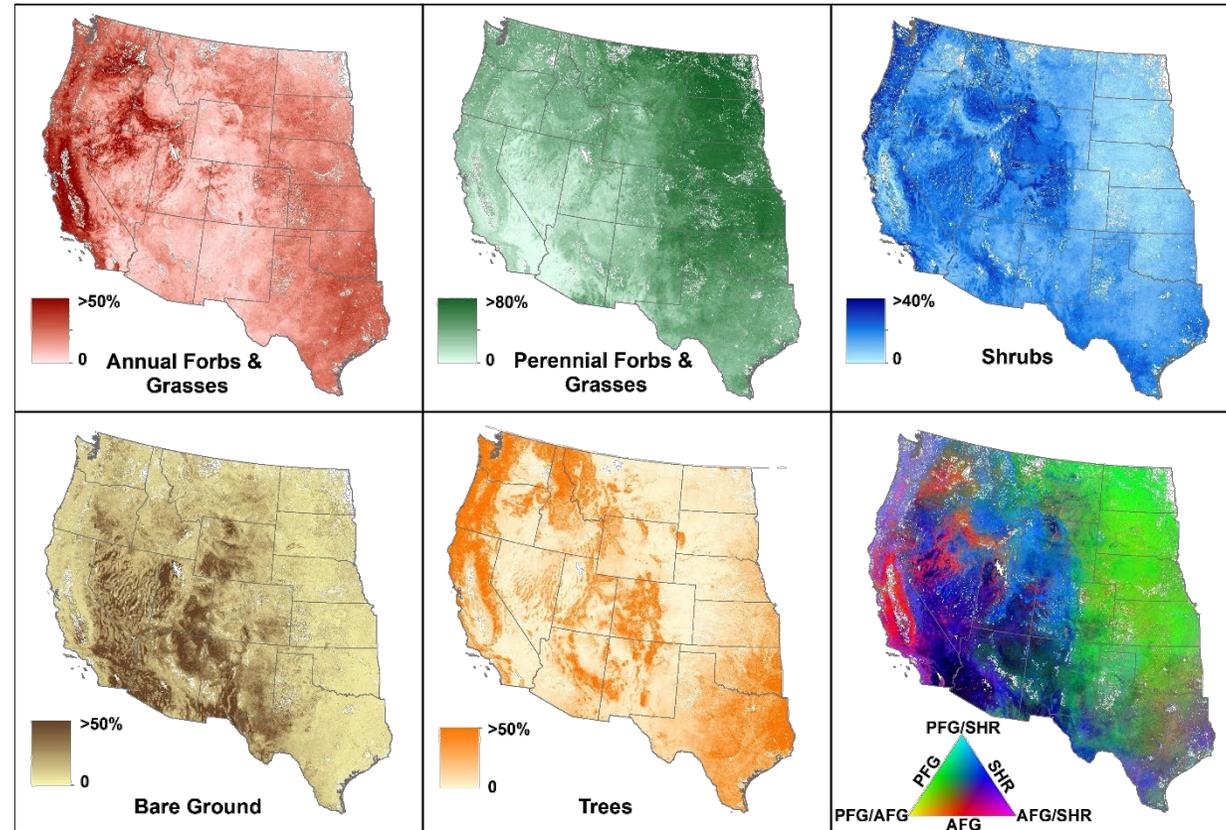


# Field Plots + Landsat + Cloud-Computing = Innovation

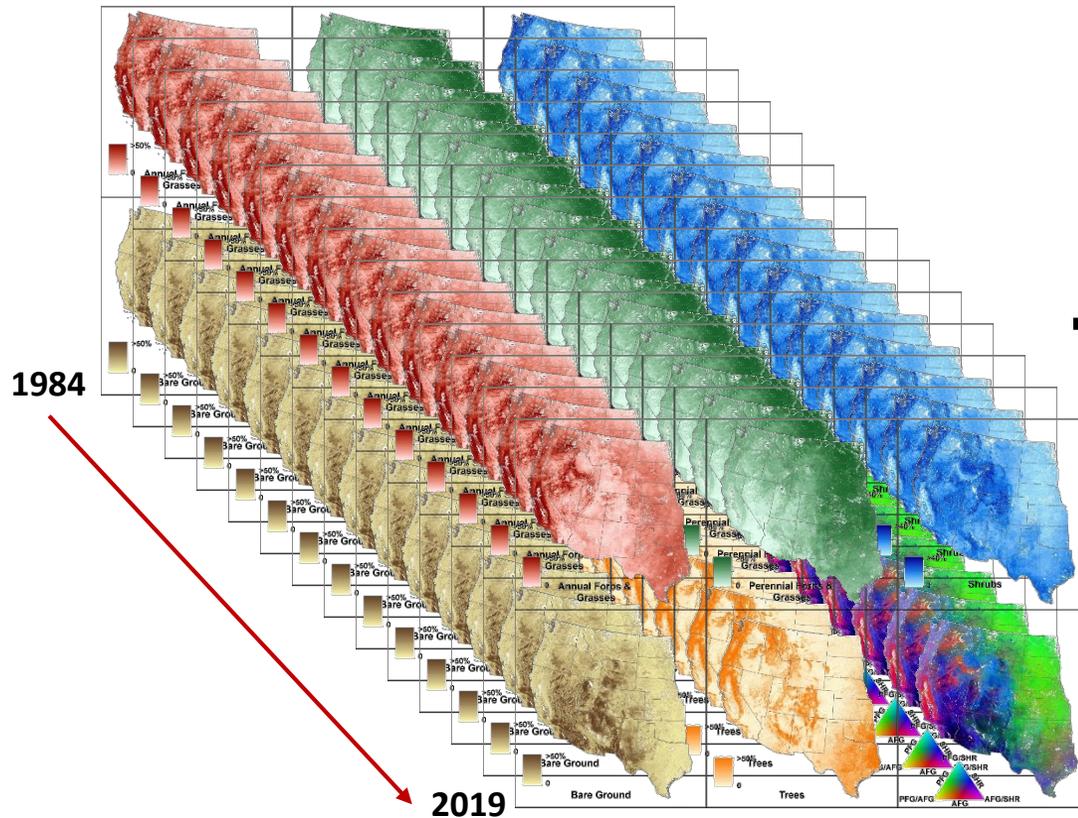


## Percent cover maps at 30m resolution:

- Annual Forbs & Grasses
- Perennial Forbs & Grasses
- Shrubs
- Bare Ground
- Trees



# Field Plots + Landsat + Cloud-Computing = Innovation



## The Rangeland Analysis Platform (RAP)

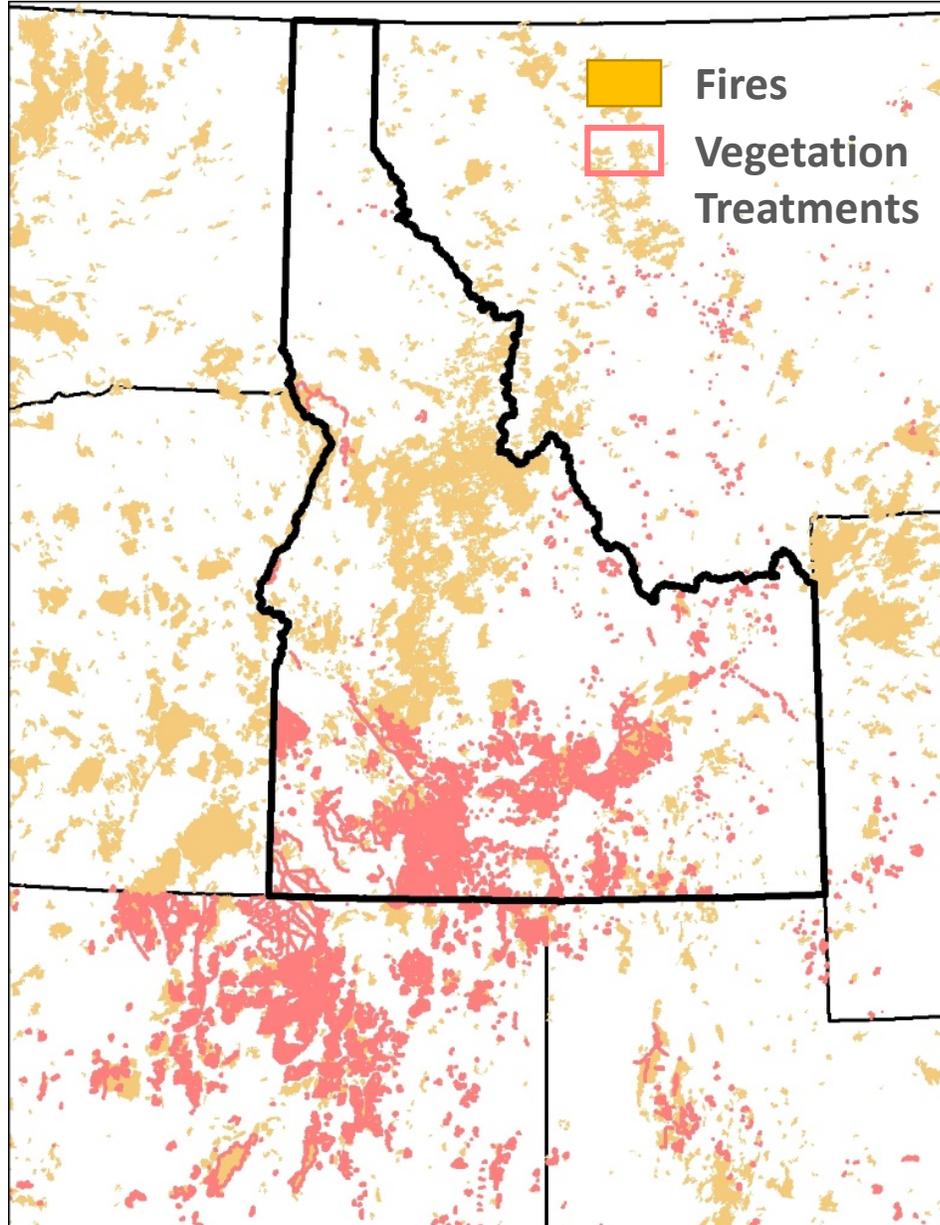


rangelands.app

...version 2.0 coming soon

# Know the history of the land

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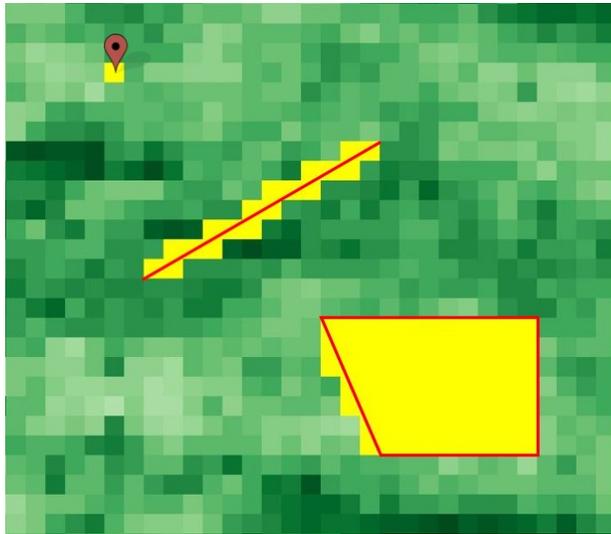
The extent of historical fires and treatments is vast. Gather information on the history of your area of interest as part of your assessment.

**Monitoring Trends in Burn Severity**  
<https://www.mtbs.gov/>

**USGS Land Treatment Digital Library**  
<https://ltdl.wr.usgs.gov/>

# Drawing features and excluding data in analysis

The data used to calculate time series is dependent on the features drawn and whether crops, urban, and water are excluded.



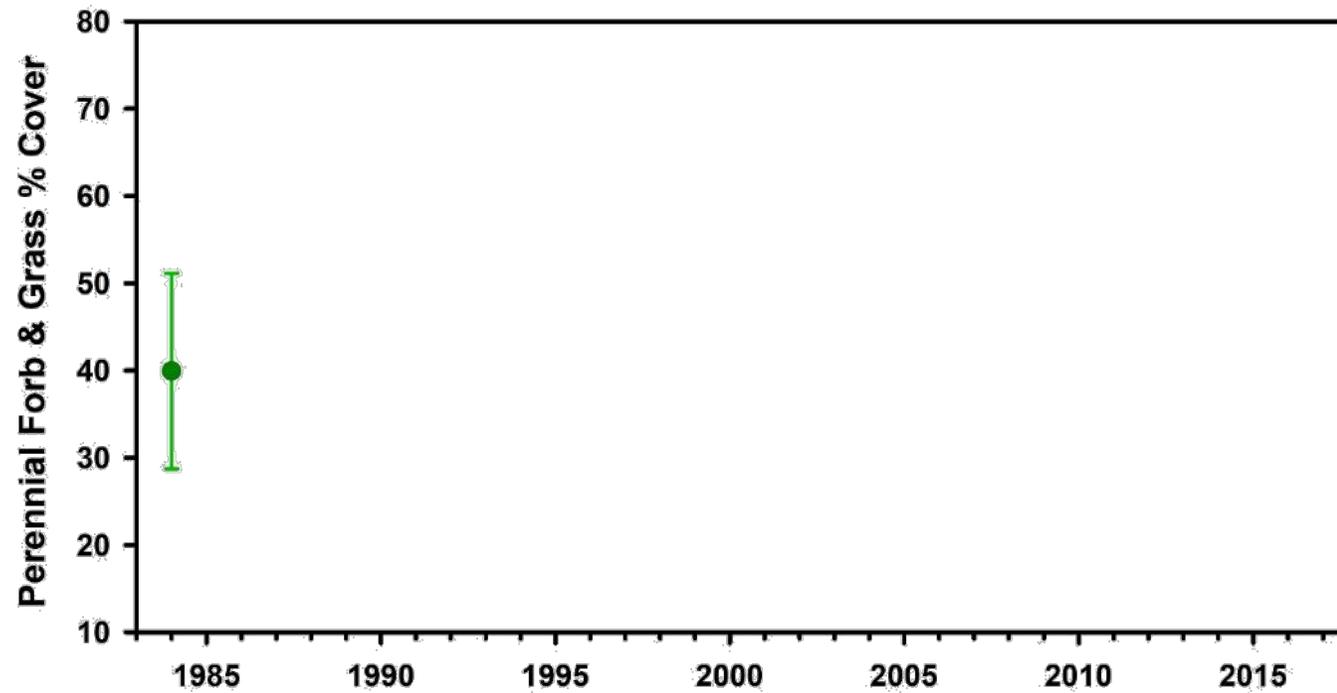
Continuous Vegetation Cover



# Take error into account when analyzing the data

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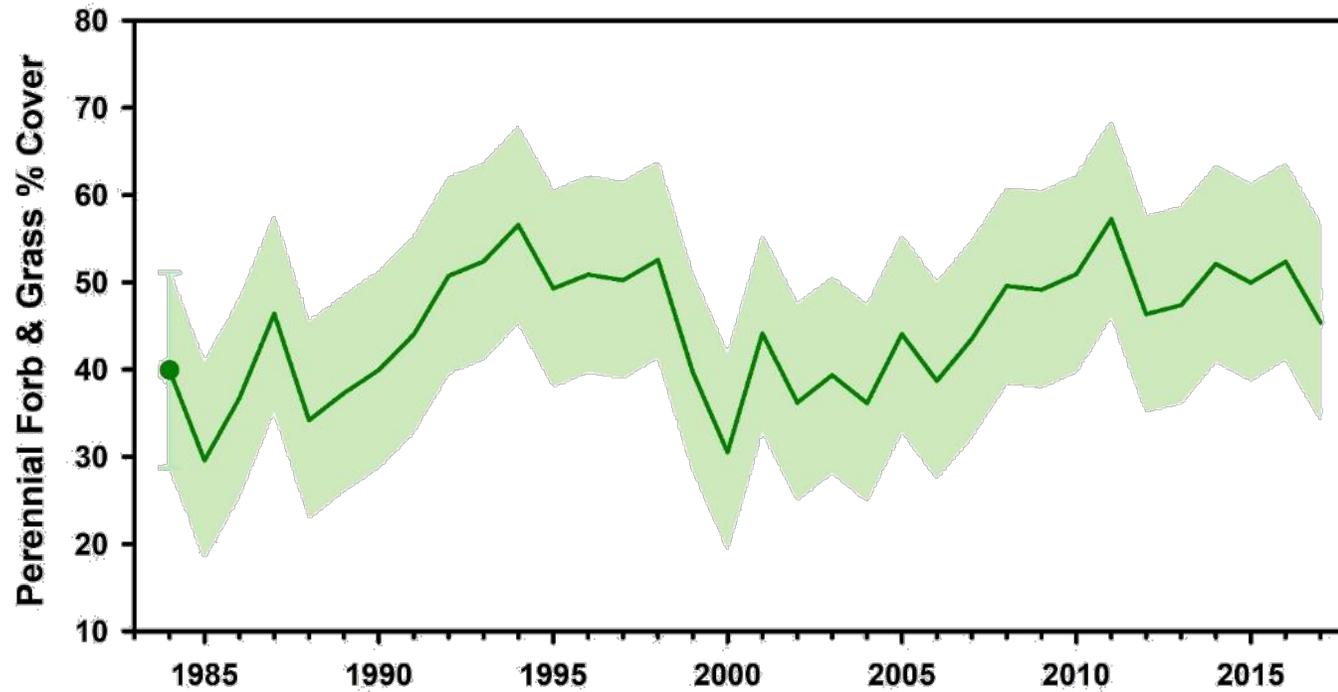
Cover Class	Annual Forbs & Grasses	Perennial Forbs & Grasses	Shrubs	Trees	Bare Ground
Mean Absolute Error (%)	7.8%	11.2%	6.9%	4.7%	7.3%



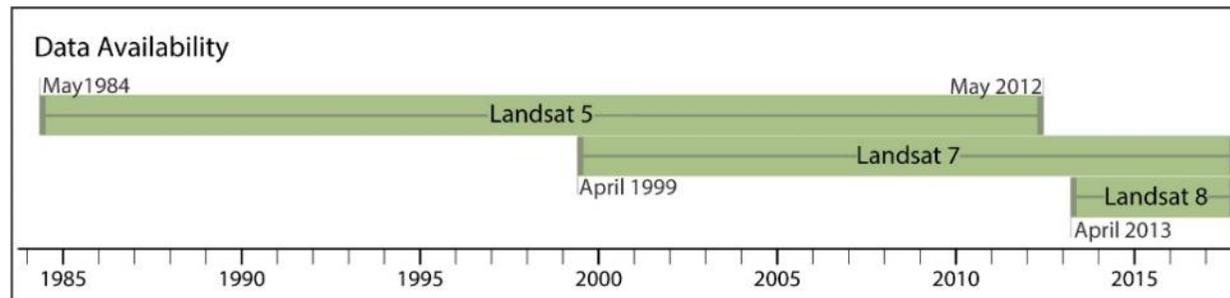
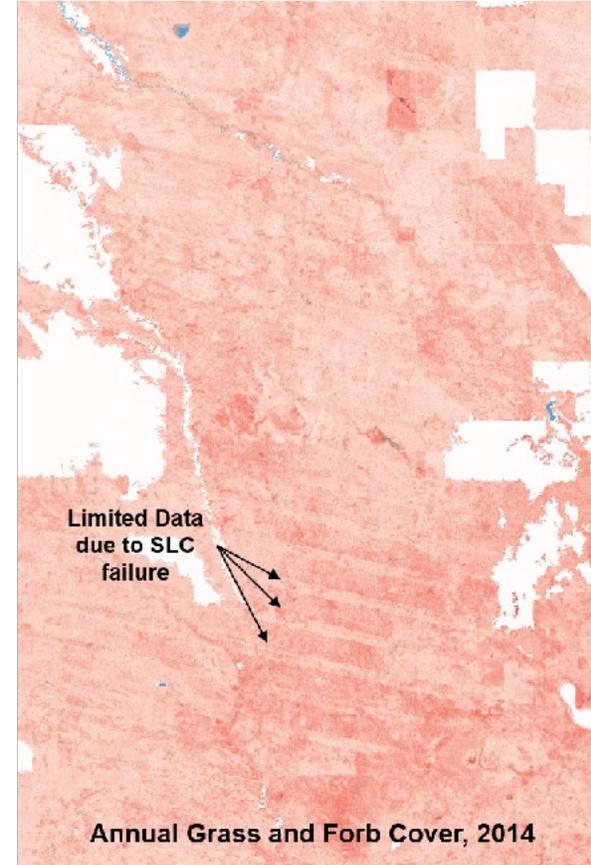
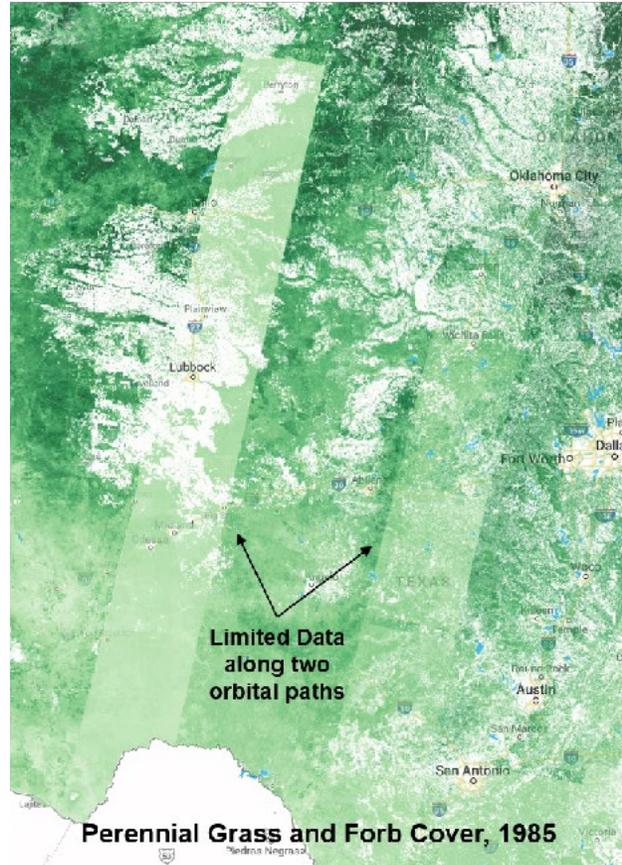
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Mean Absolute Error (%)	7.8%	11.2%	6.9%	4.7%	7.3%



# Years with limited Landsat data can alter land cover values



# Why doesn't RAP data match my expected cover value?

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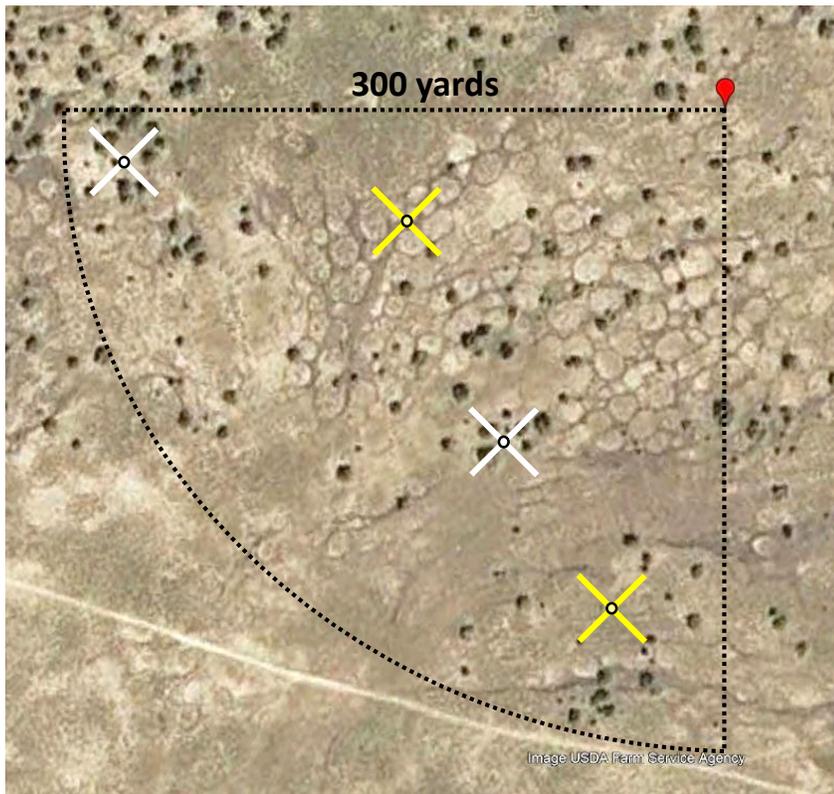
**What is your percent tree cover estimate?**

# Why doesn't RAP data match my expected cover value?



Visual estimates may vary significantly from aerial or satellite estimates.

SWA Tree cover mean = 4.5%  
RAP Tree cover mean = 4%



# RAP is another tool for your toolbox

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⊘ This tool **DOES NOT** replace boots on the ground.

The maps and data provided by RAP are intended to be used alongside local knowledge and site-specific data.

⊘ This tool **IS NOT for precision** monitoring and management.

The RAP should *not be used in isolation* to quantify rangeland resources, to define thresholds, or to evaluate the efficacy of management practices or treatments.

✓ RAP **provides a historical and spatially complete view** of your area.

✓ Use RAP to examine **land cover trends through time**.

✓ Use RAP to **assess land cover variability** in your area of interest.

✓ Use RAP **alongside local knowledge and data to inform conservation and management action plans**.

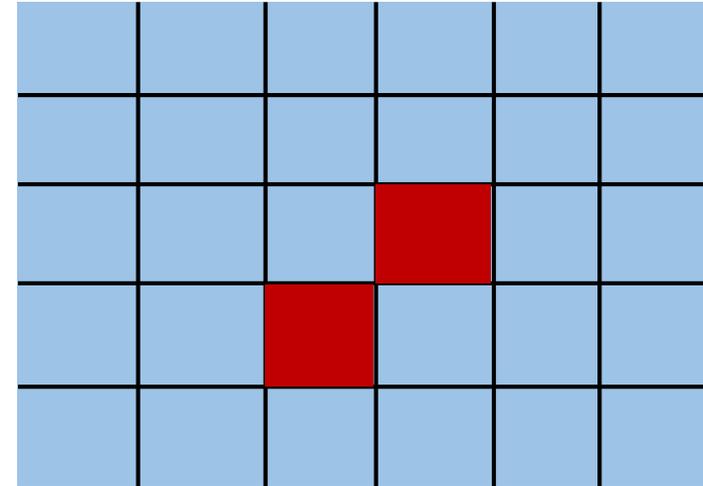
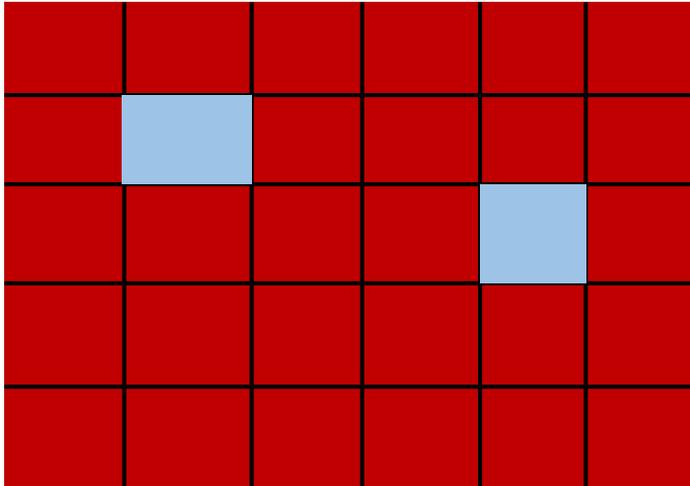


# The Cheatgrass Challenge

A proactive strategy for halting conversion of sagebrush rangelands to annual grasslands

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/id/home/>

# Landscape Context Matters

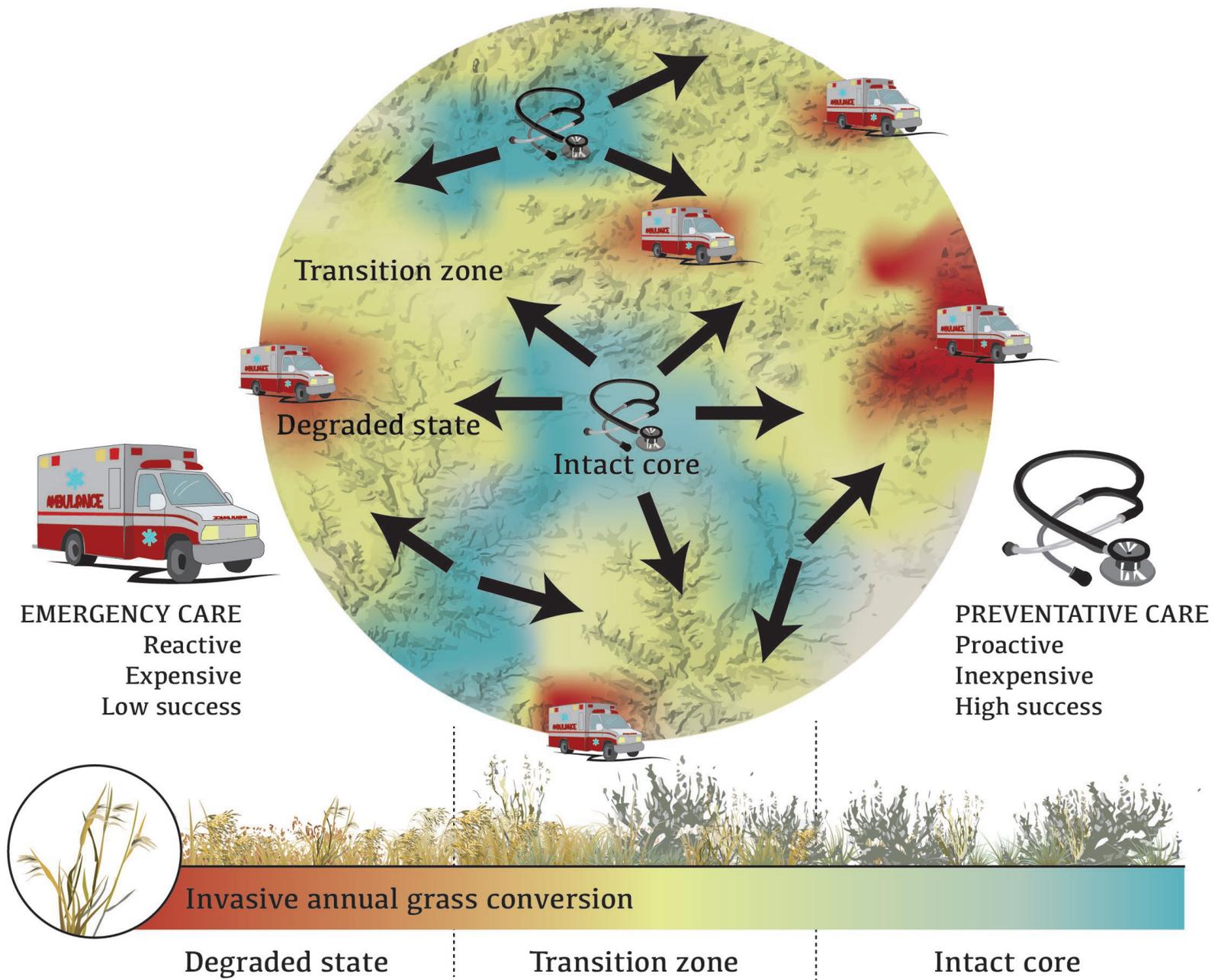


Annual grass-infested



No/low annual grasses

*Which landscape is annual grass control more likely to be more effective in?*



**EMERGENCY CARE**  
 Reactive  
 Expensive  
 Low success

**PREVENTATIVE CARE**  
 Proactive  
 Inexpensive  
 High success

Invasive annual grass conversion

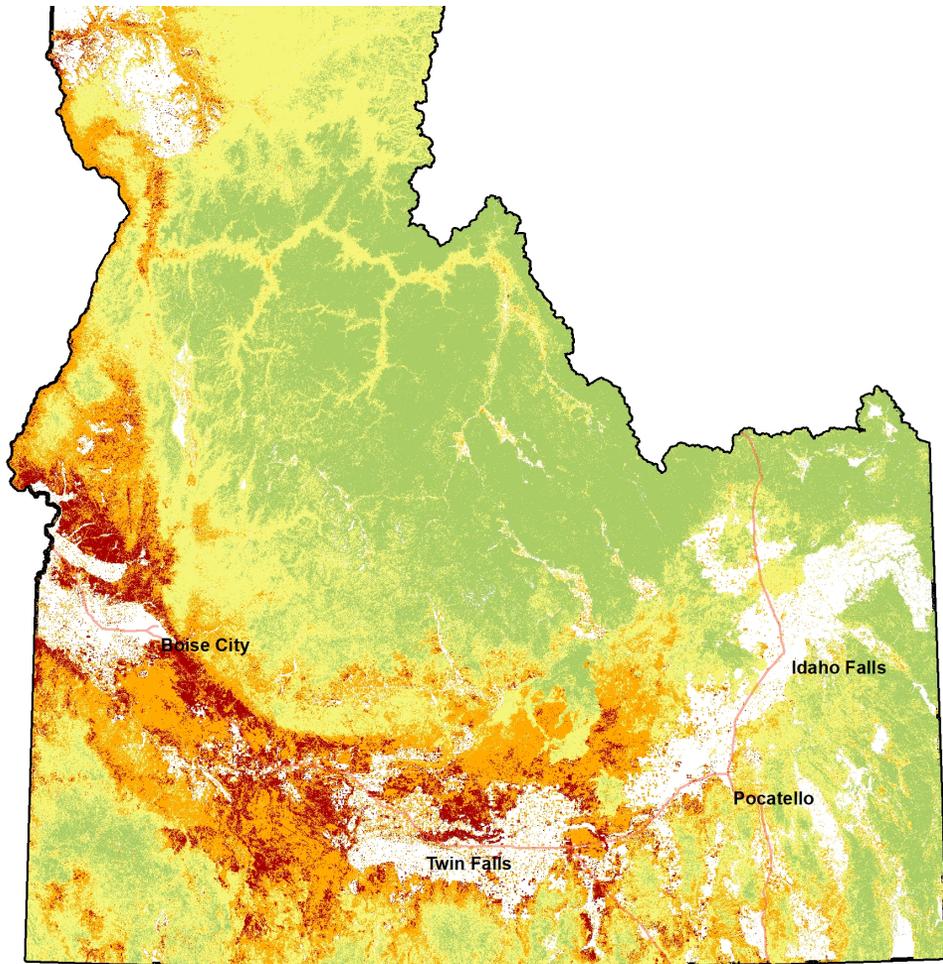
Degraded state

Transition zone

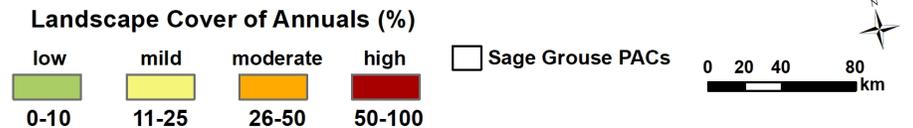
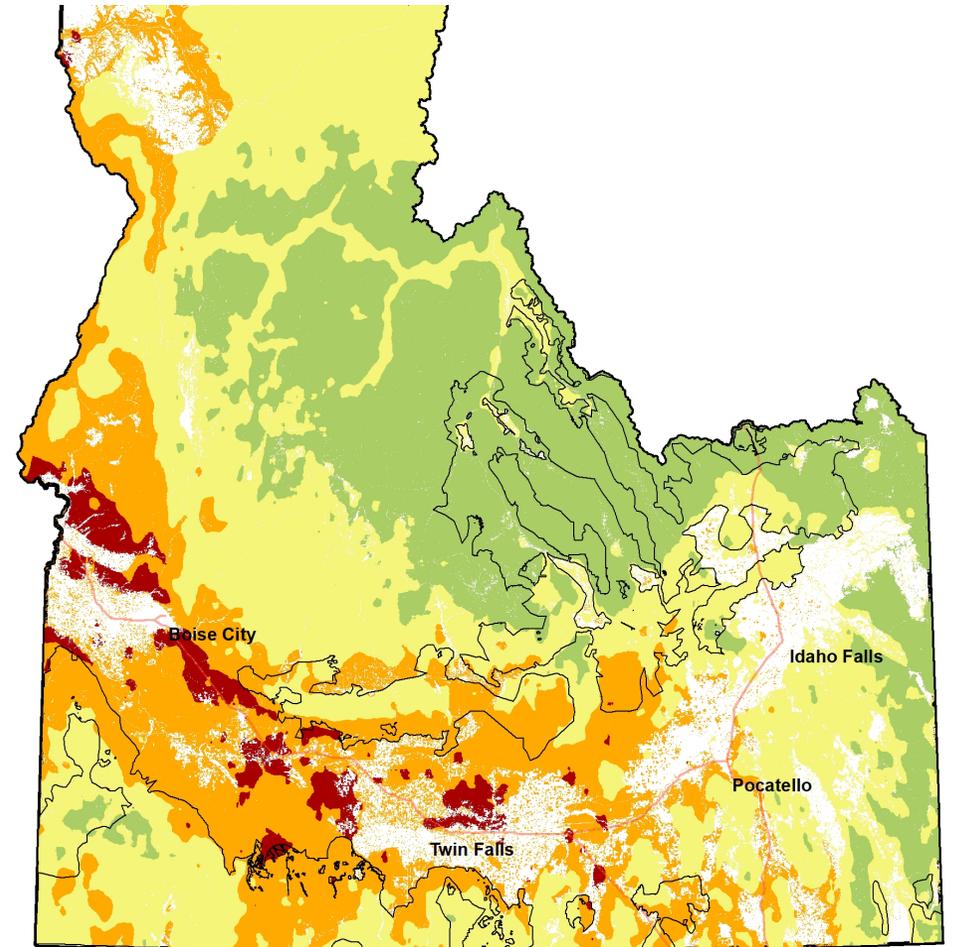
Intact core

# Using RAP Data to Develop a Spatial Strategy

Max cover (2016-2018) at 30-m resolution



Moving window analysis at 300-m resolution



# Identifying Broad Regions to Provide Context for Local Management

*What does the neighborhood around you look like?*

## 1) Core

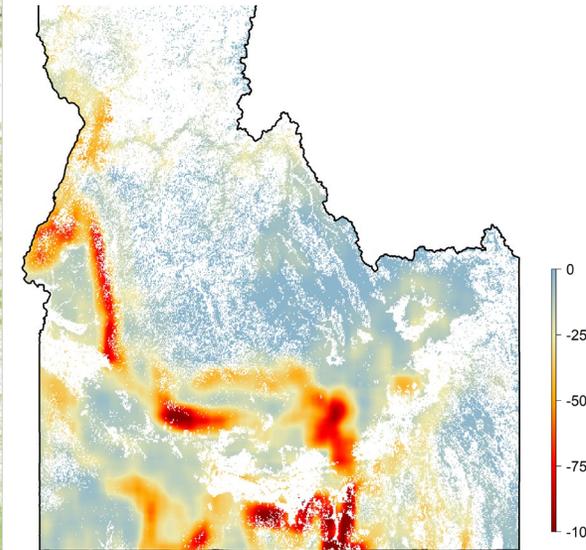
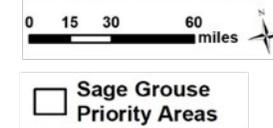
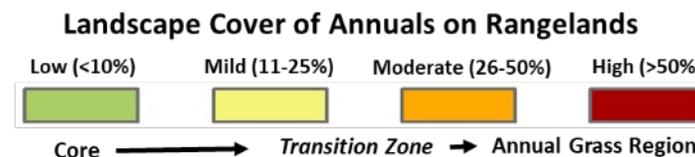
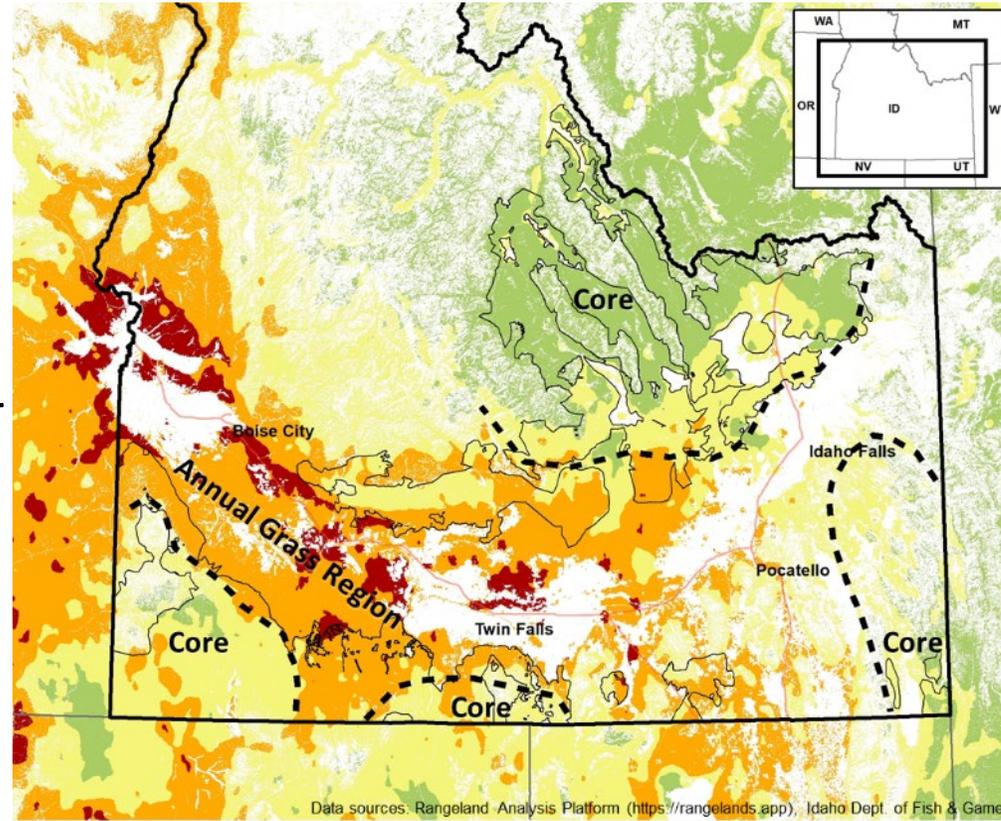
- Regionally intact; relatively low cover of annuals

## 2) Annual Grass Region

- Dominated by moderate-to-high cover of annuals

## 3) Transition Zone

- Areas actively undergoing regional state transitions to annual grasses



**State Transition Screening**  
(Annuals vs. Shrubs)

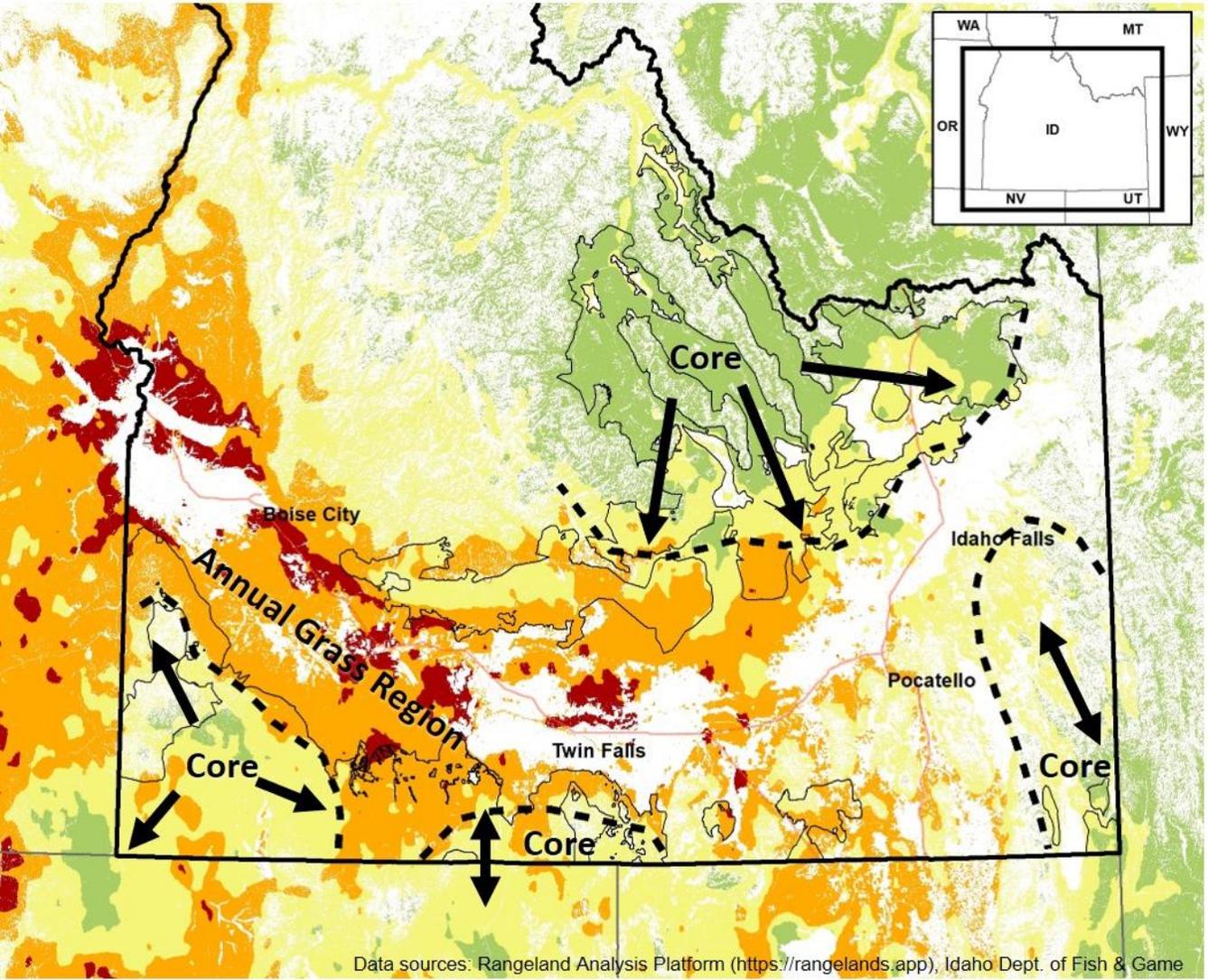


Data sources:  
Transition data: (Uden et al., 2019)  
Landscape cover: Rangeland Analysis Platform (<https://rangelands.app>; Jones et al., 2018)

# Idaho's Cheatgrass Challenge Strategy

Defend the core → Grow the core → Mitigate impacts

1. Defend relatively intact core from annual grass conversion
2. Grow the core over time
3. Mitigate severe impacts of the cheatgrass-fire cycle on life and property

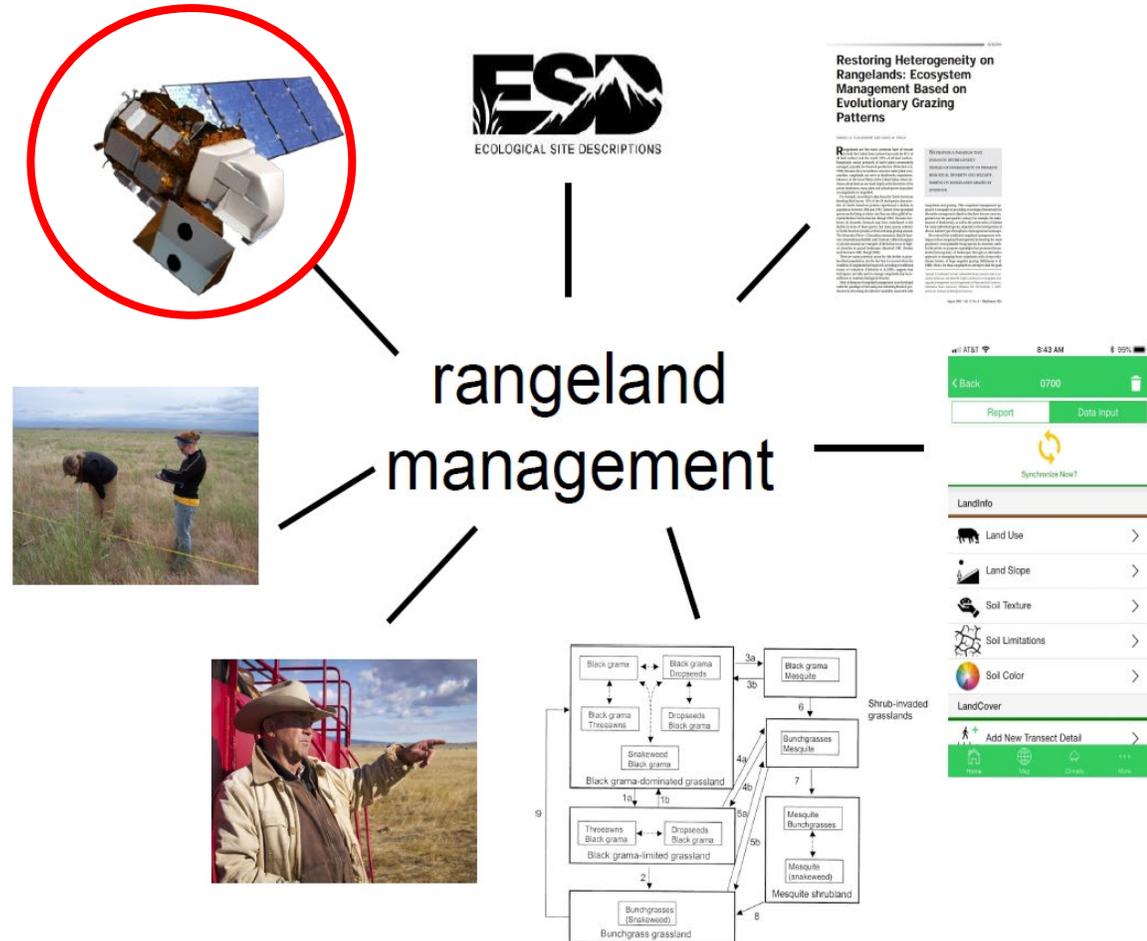


Landscape Cover of Annuals on Rangelands



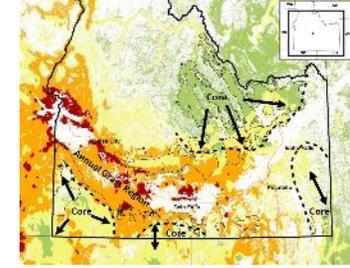
# How can RAP data be used to aid planning and monitoring?

1. Gain landscape context
2. Identify areas for further site assessment
3. Track change through time
  - Pre-treatment/fire history
  - Post-treatment/fire monitoring
    - *Are we headed in the right direction?*



**Remember:** Remote-sensing data are just one tool in the toolbox meant to be used alongside local knowledge

# Applications of RAP under different management scenarios



## Prevention

- Early Detection Rapid Response (EDRR)

## Restoration/Rehabilitation

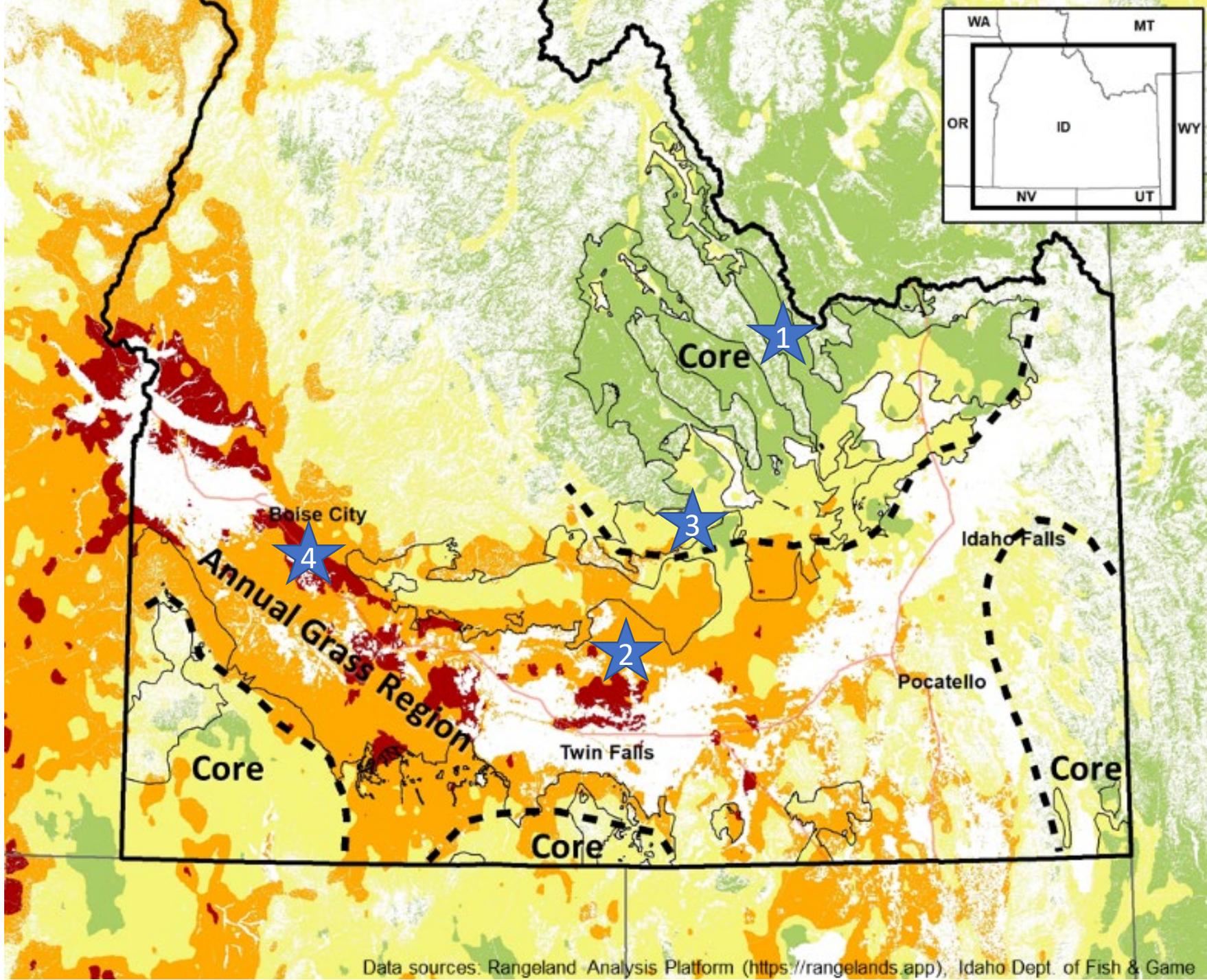
- Post-fire rehabilitation
- Restoration

## Mitigation

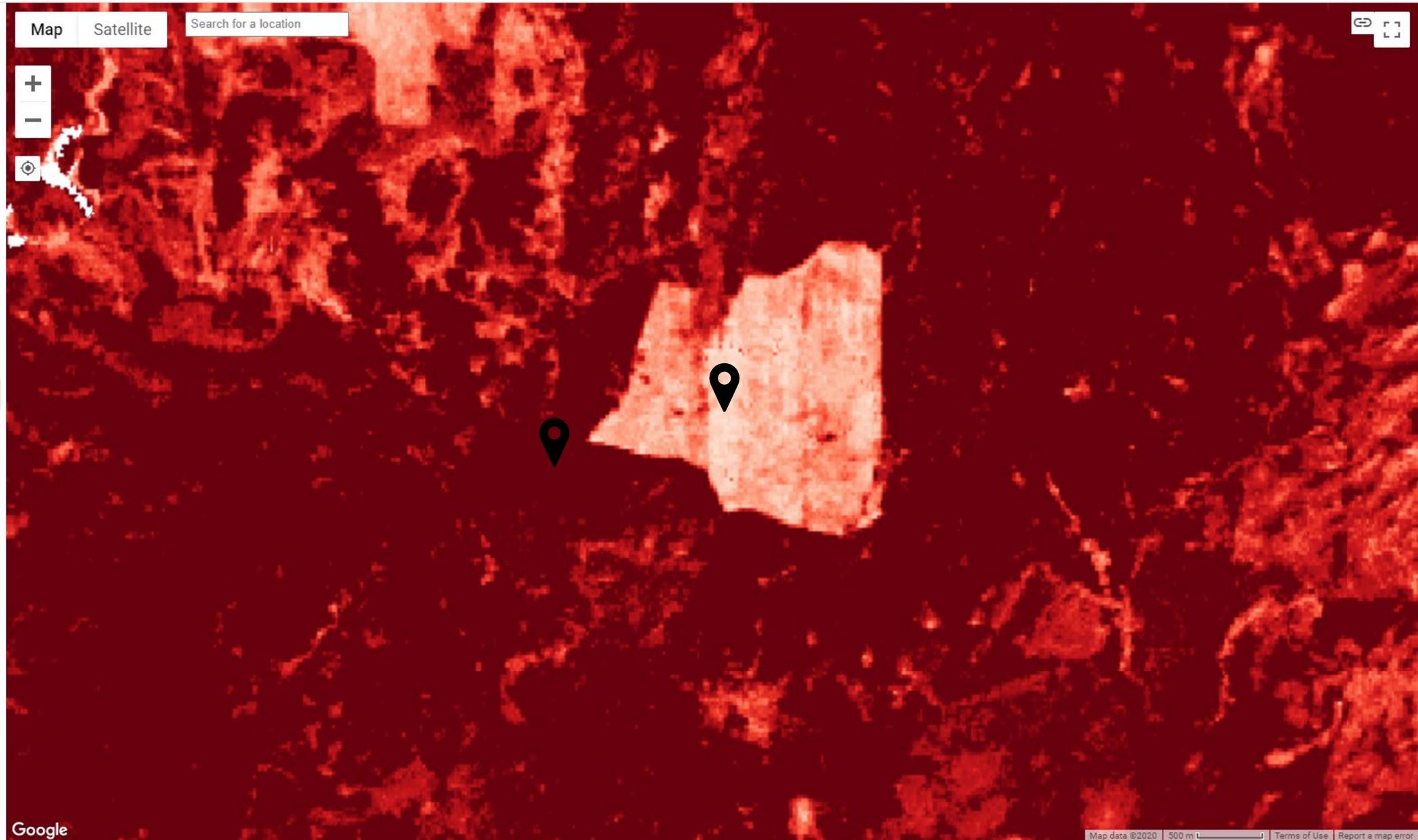
- Fine fuels reduction (strategic grazing and/or fuel breaks)



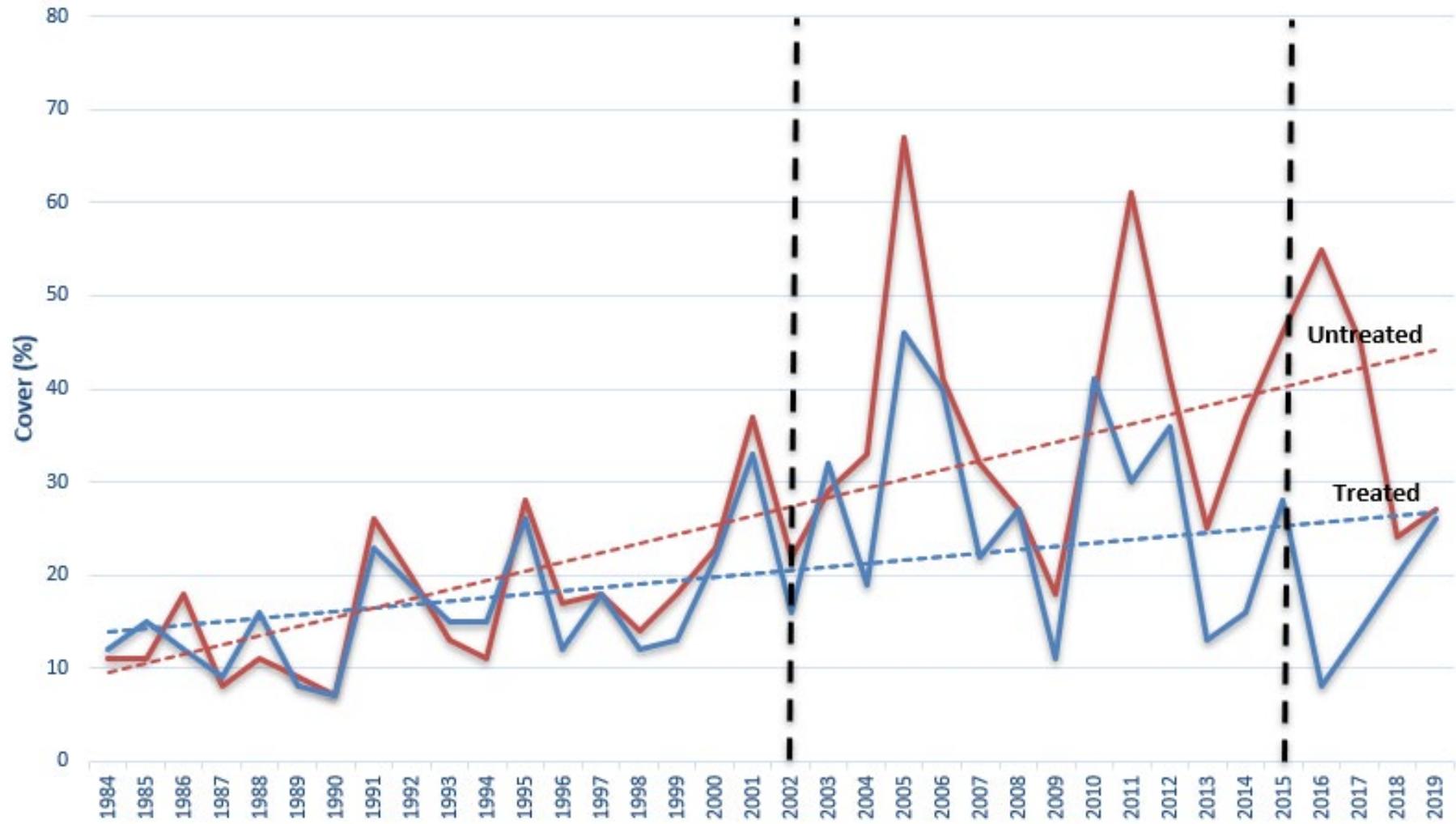
Click on stars



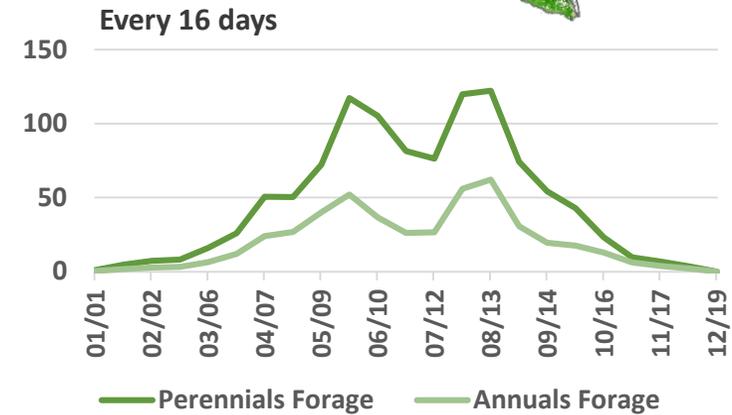
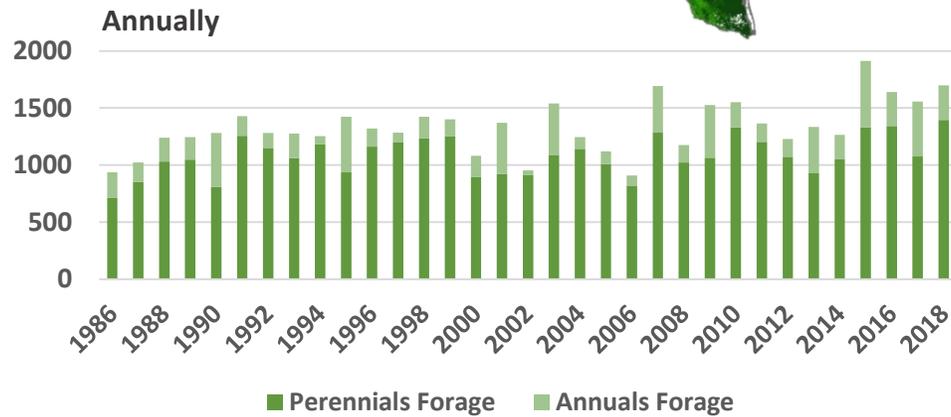
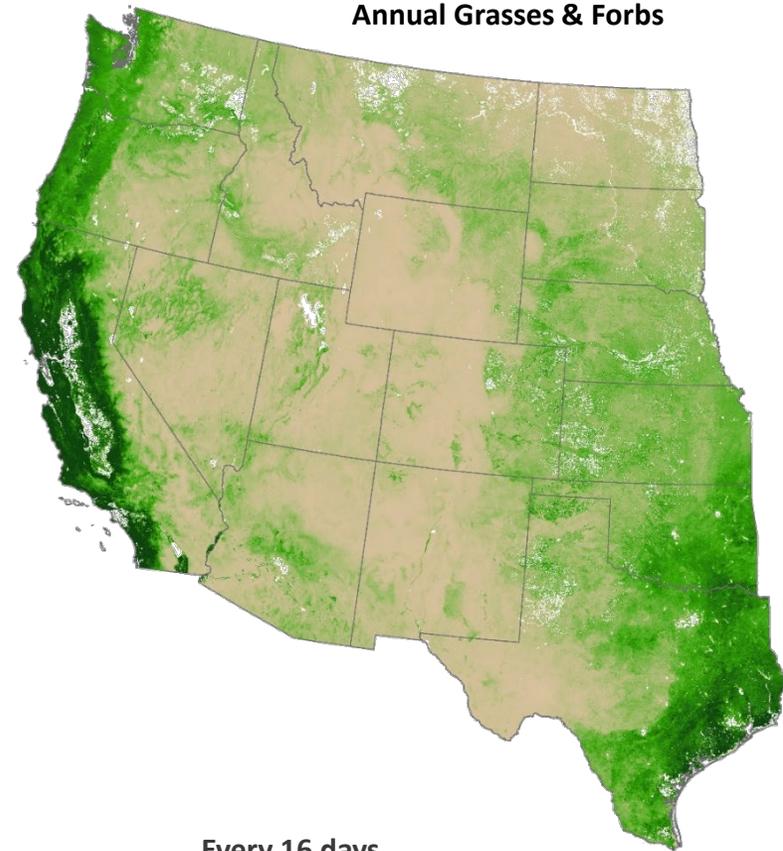
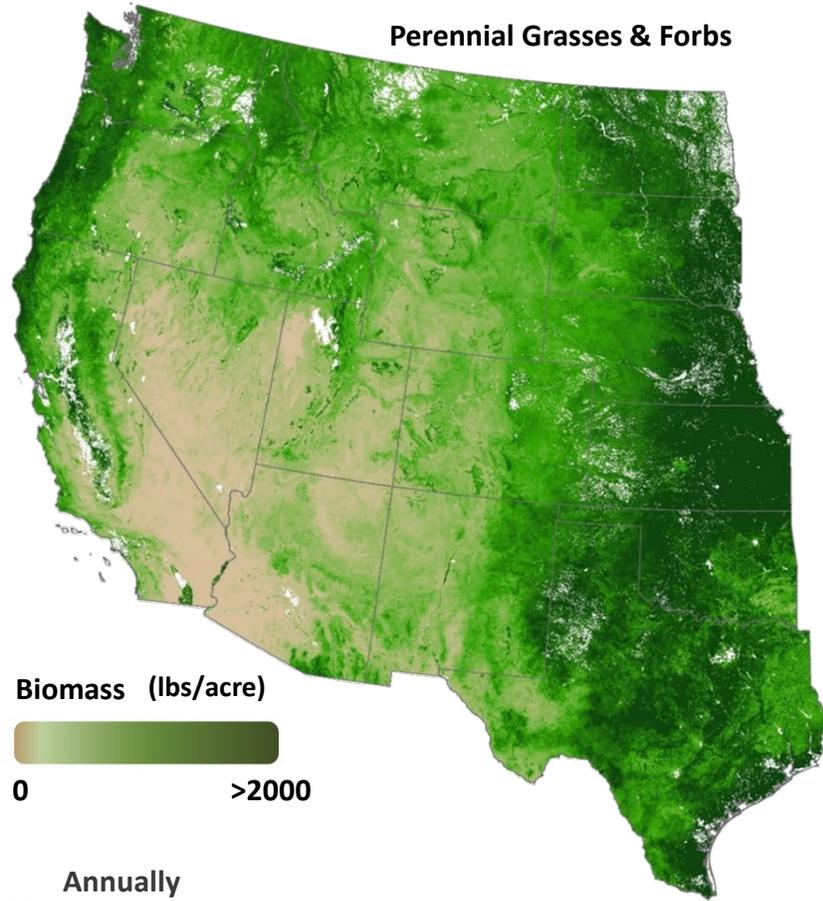
# Are we headed in the right direction?



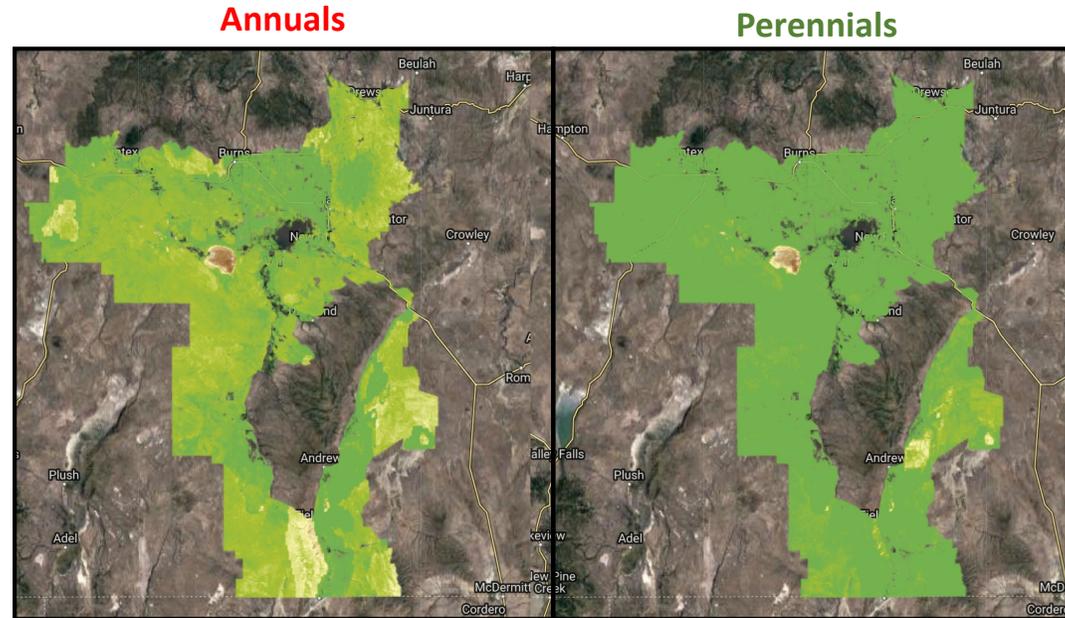
### Annual Forb & Grass Cover (1984-2019)



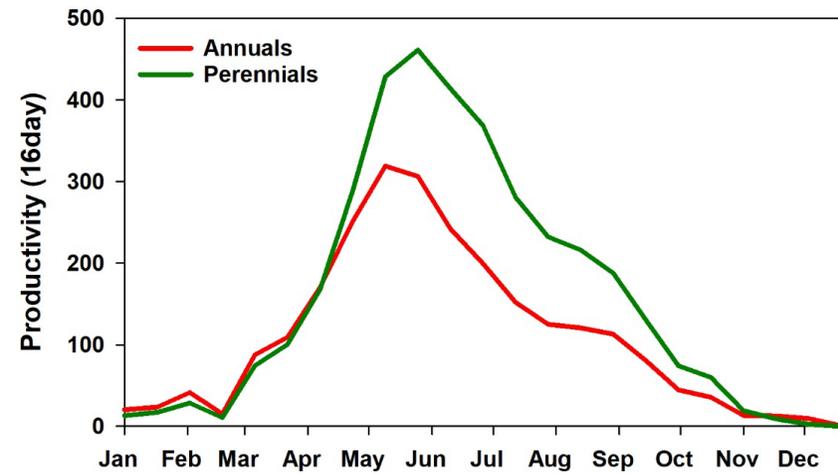
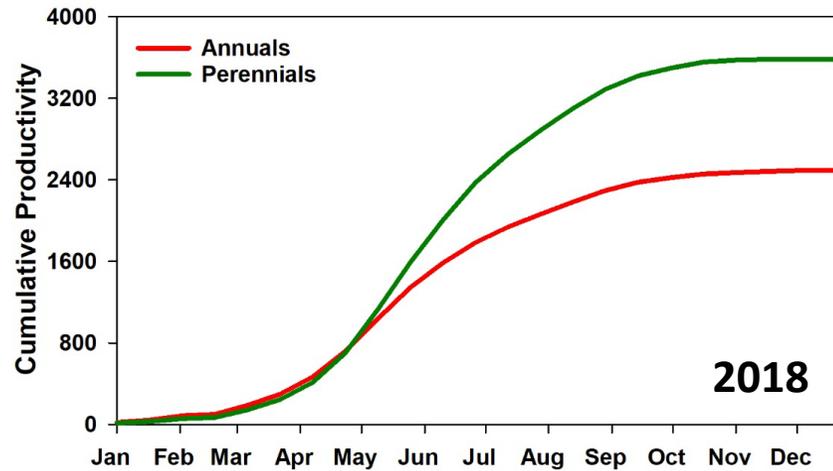
# Coming Soon to RAP: Herbaceous Vegetation Production



# Biomass as a proxy for fuel loads



Vegetation Productivity



# Questions?



Photo by: Mandi Hirsch



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Matthew Jones, [matt.jones@mso.umt.edu](mailto:matt.jones@mso.umt.edu)

