



# Cattle Grazing Effects on Fuel Loads and Wildfire Behavior

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# Outline

1. Fine Fuel Reduction on Grazed California Rangelands
2. Impacts of Fuel Reduction on Wildfire Flame Lengths
3. Spatial Variability in Fuel Reduction
4. Long-term Effects of Grazing on Woody Fuels

# Cattle Grazing for Fine Fuel Reduction

- Park Districts, Water Districts, Habitat Conservation Plans, and regional policy groups recommend cattle grazing for fuels reduction



# Fuel Reduction

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Ungrazed



Grazed

## Cattle grazing reduces fuel and leads to more manageable fire behavior

Grazing cattle can help reduce fuel loads on rangelands and mitigate the ever-growing risk of catastrophic wildfires.

by Felix Ratcliff, Devii Rao, Sheila Barry, Shane Dewees, Luke Macaulay, Royce Larsen, Matthew Shapero, Rowan Peterson, Max Moritz and Larry Forero

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### Abstract

Cattle play an important role in wildfire management by grazing fuel on California rangelands. The benefits of cattle grazing have not been thoroughly explored, though. Using statewide cattle inventory, brand inspection and land use data, we have estimated that cattle removed 11.6 billion pounds (5.3 billion kilograms [kg]) of non-woody plant material from California's rangelands in 2017. Regionally, these reductions varied between 174 and 1,020 pounds per grazed acre (195 to 1,143 kg per hectare). Fire behavior is characterized in this paper by flame length. Fire behavior models suggest that these regional fuel reductions lower flame lengths, and lead to more manageable wildfires. In addition, fire-based models show that cattle grazing reduces fuel loads enough to lessen fire hazards in many grazed areas. Moving forward, there may be significant opportunities to expand strategic grazing on rangelands to add extra layers of protection against wildfires.

Recent wildfire seasons in California have been some of the worst on record. This "new reality" highlights the importance of understanding how land management practices such as cattle grazing affect wildfire behavior. Fire behavior is characterized in this paper by flame length. While climate change can lead to more severe fire behavior for California wildfires, our findings suggest that land managers can help balance out these dangers in grasslands by using livestock grazing to reduce fuel loads. CAL FIRE's California Vegetation Treatment Program (CalVTP) utilizes prescribed herbivory, which is the targeted grazing of cattle, sheep and goats to reduce wildland plant populations. While not included in CalVTP, conventional grazing also plays an important role in fuel load reductions.

Livestock grazing is a prevalent land use on California's rangelands and is considered a cost-effective method of reducing fuel loads (Taylor 2006). As such, fuel reduction through livestock grazing is a

These stocker cattle graze seasonally, during spring, reducing fine fuels across a large landscape. Photo: Devii Rao.

# Research Published in the Journal of California Agriculture

## Questions: To What Extent do Cattle Reduce Fine Fuel Loads Across the State?

- *And how might that affect wildfire behavior?*

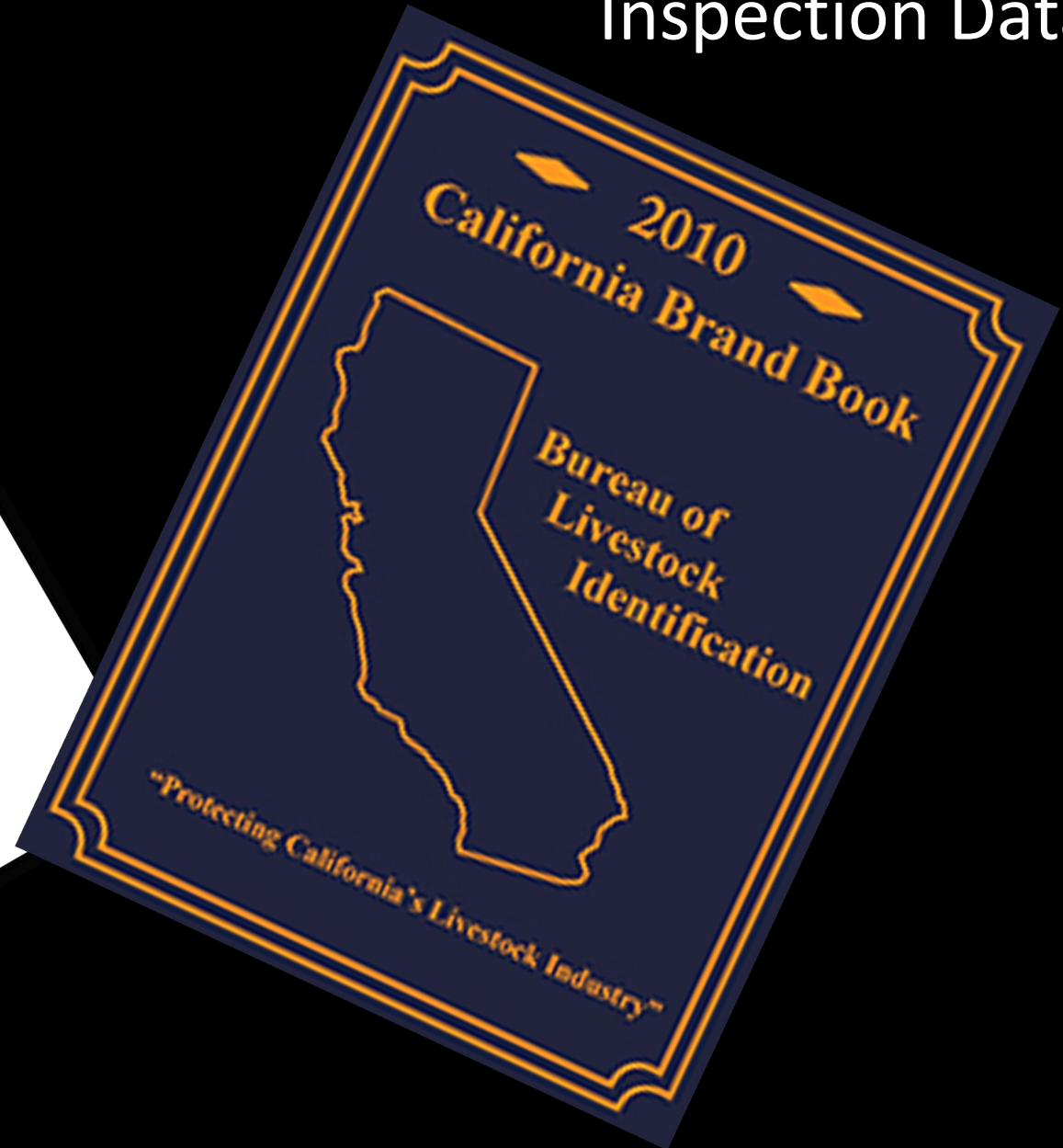
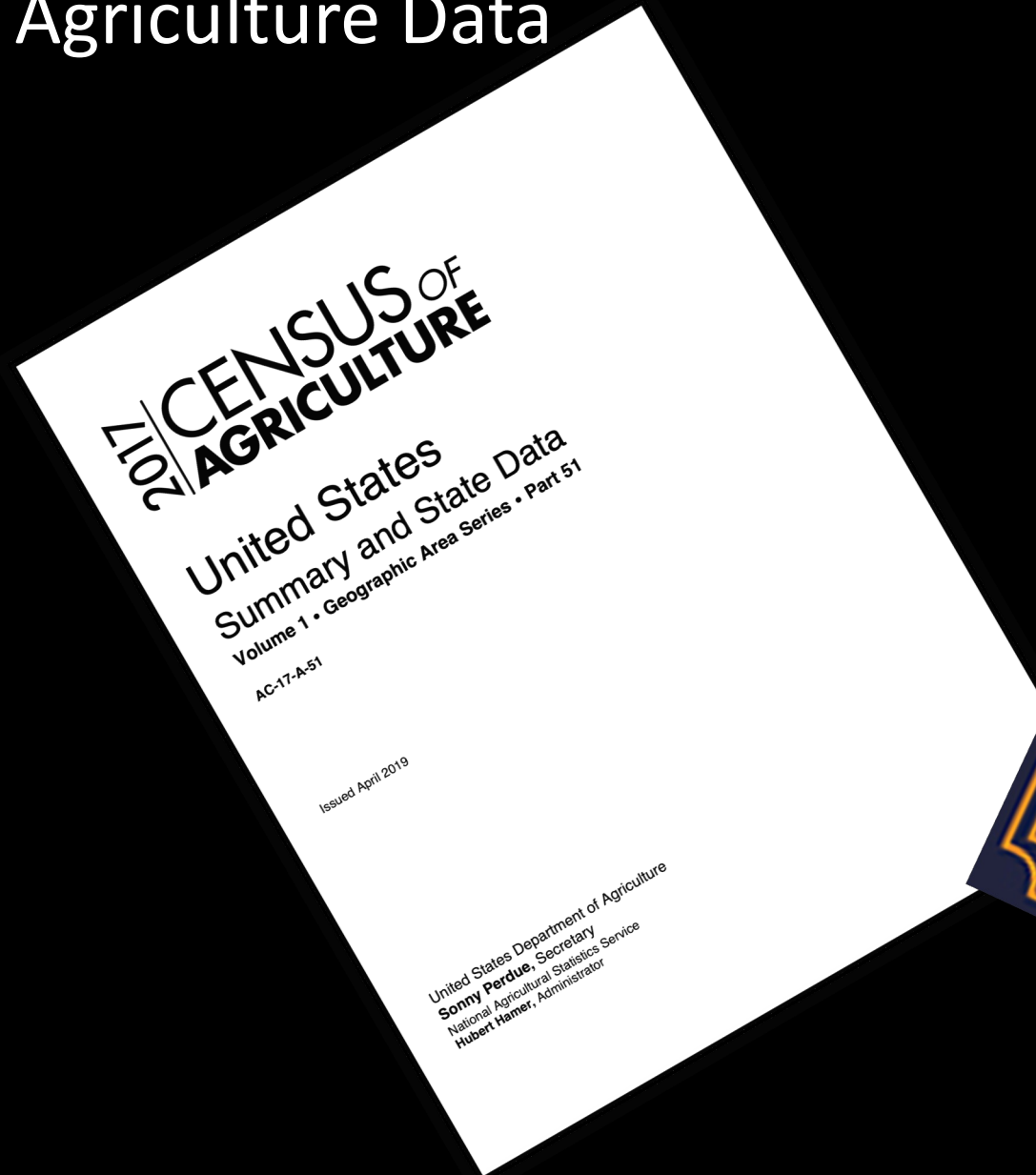
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- Sheila Barry
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# 2017 USDA Census of Agriculture Data

# 2017 Brand Inspection Data

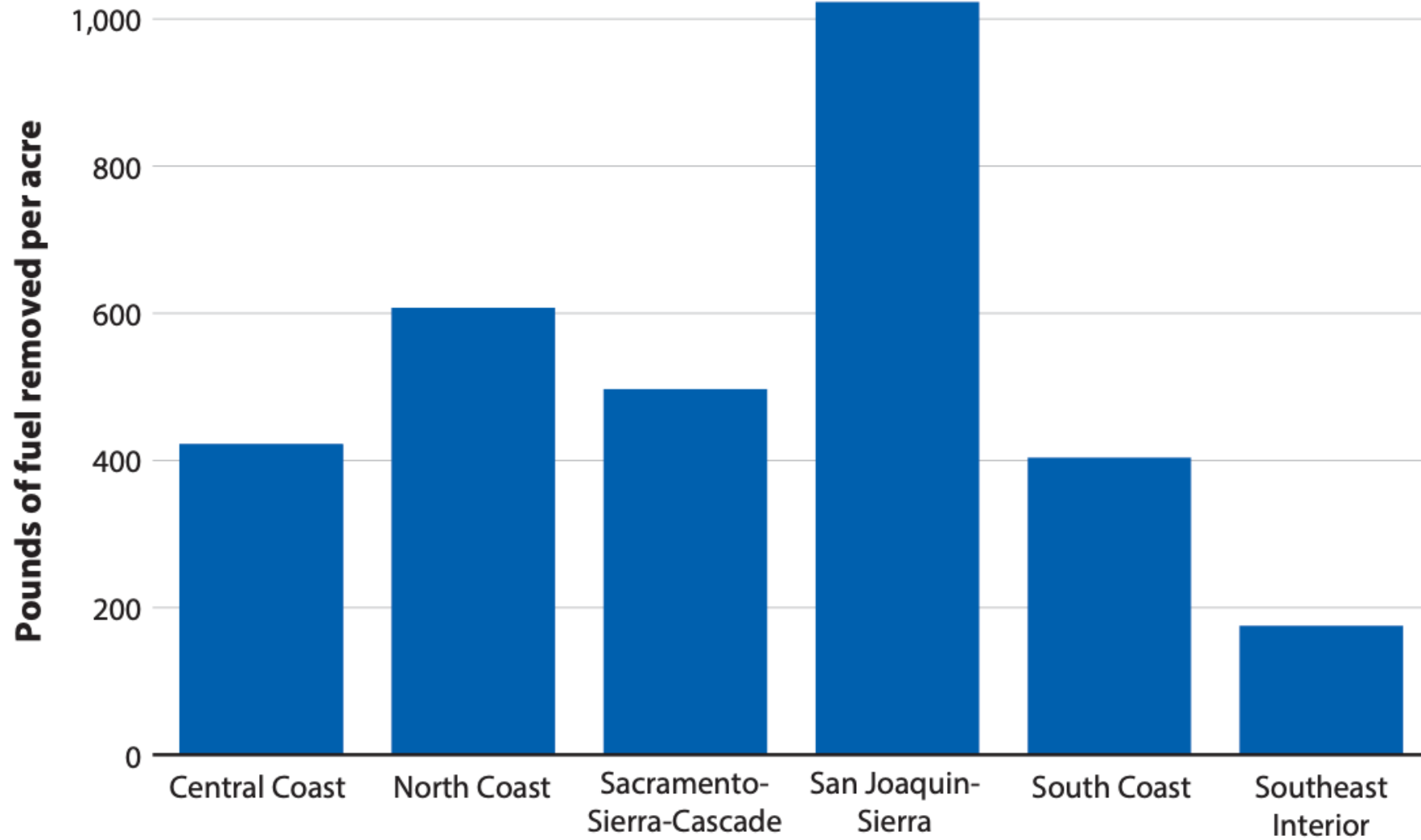




# Fuel Reduction Stats

In 2017:

- Number of head of beef cattle: 1.8 million
- Number of acres grazed: 19.4 million
- Total forage consumption: 11.6 billion pounds



**FIG. 3.** Pounds per acre of fuel reduction on grazed rangelands in California regions.



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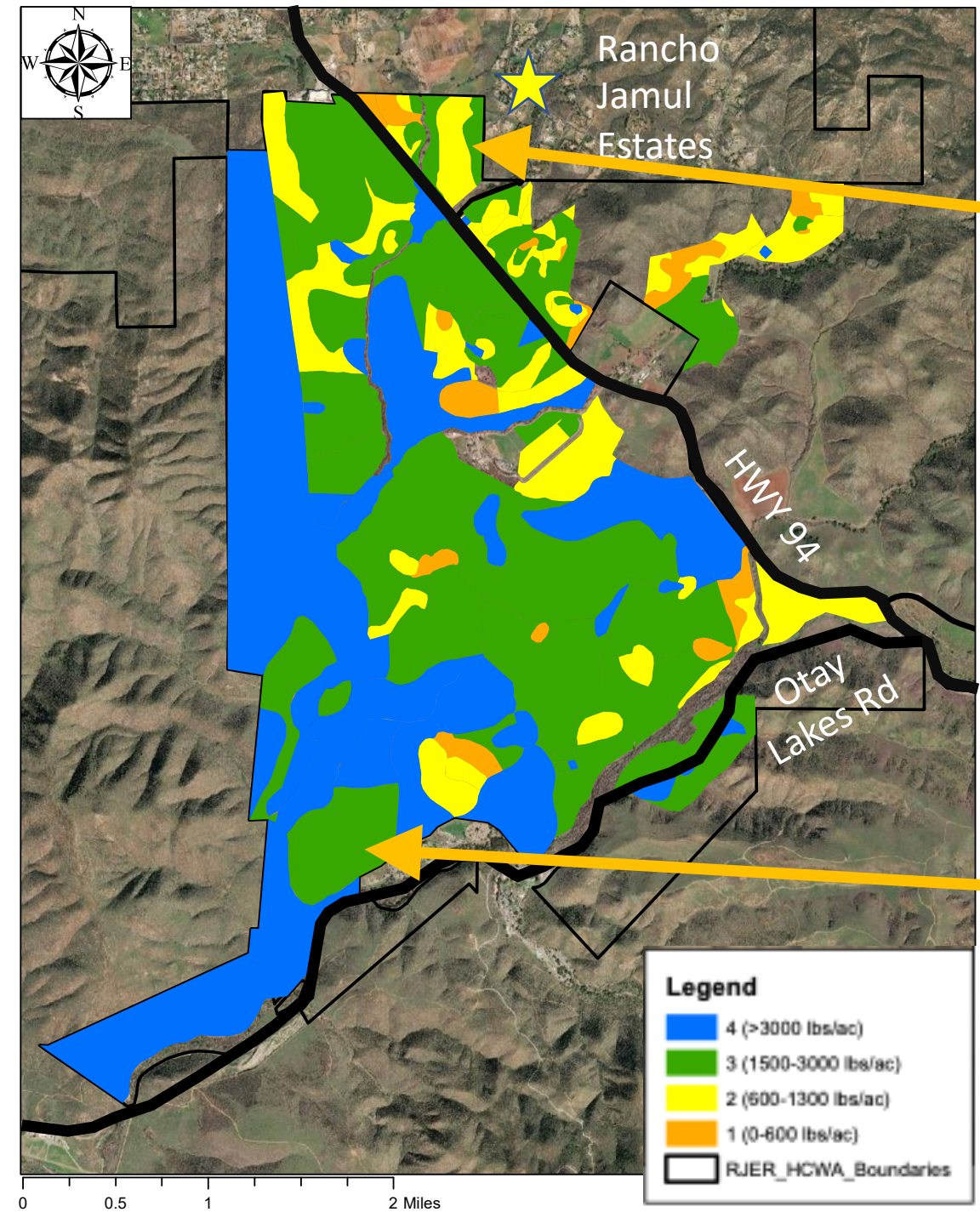
# Fuel Load and Flame Length Models



- Flame lengths strongly influenced by:
  - Fuel Load
  - Fuel Moisture
  - Weather
  - Topography

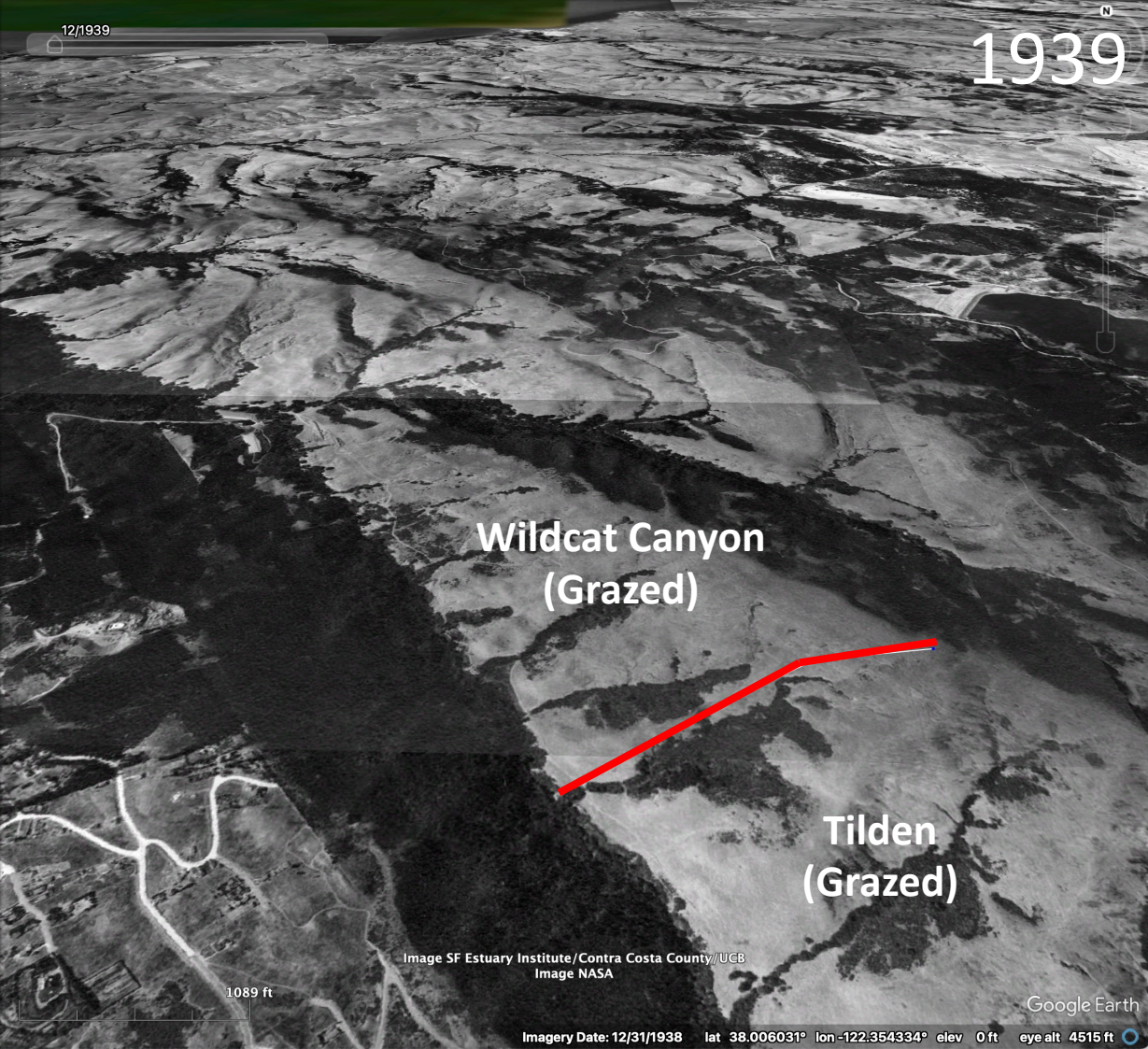
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SFEI, Google earth

Ratcliff & Huntsinger 2023, Google Earth

# Grazing Reduces Shrub Encroachment

# Conclusions

- Beef cattle reduce fuels on short and long time periods
- Careful planning can improve ranch-level outcomes
  - Consider landscape-level risk factors
  - Incorporate the needs of the grazing operation
  - Balance fuel reduction with other management and conservation goals
- Policy to support beef cattle grazing as a viable fuel reduction tool
  - Support long-term grazing programs (not just temporary/seasonal grazing)
  - Acknowledge the value provided to park districts, state, and federal lands from cattle grazing
- Research needs
  - Grazing and shrub encroachment dynamics in different parts of the state

Thank you!