Why Burn?

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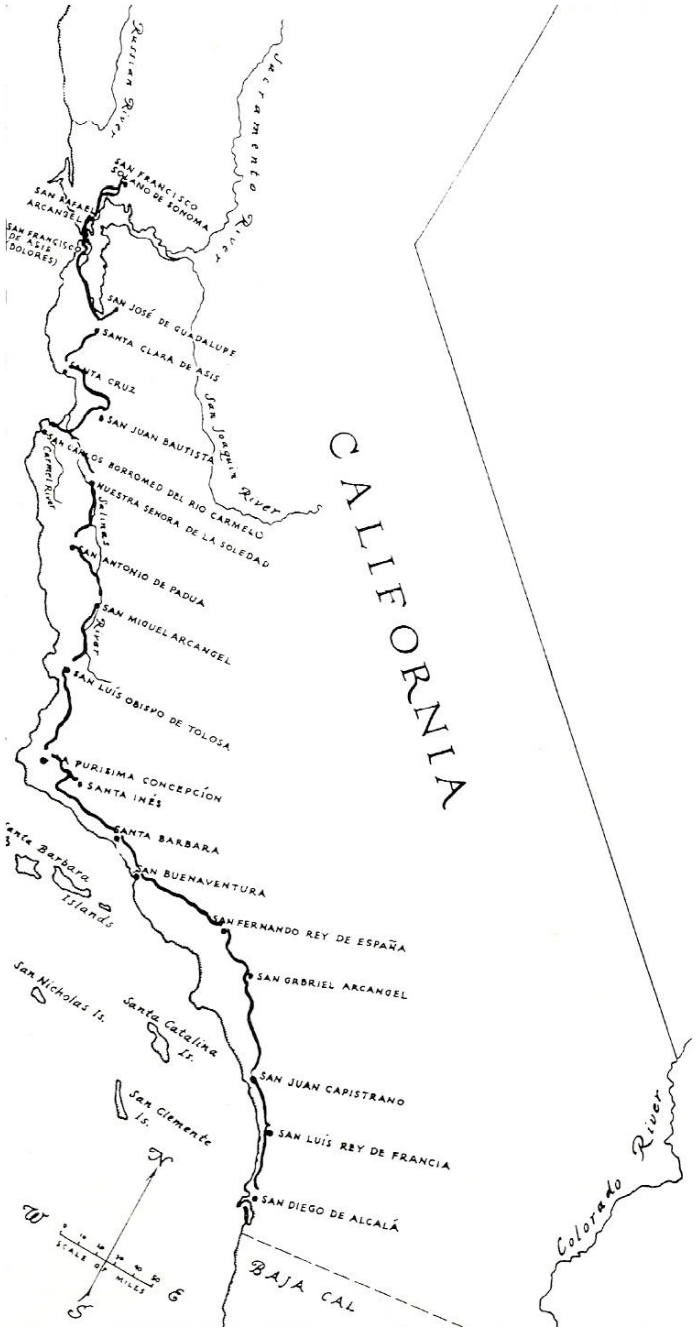
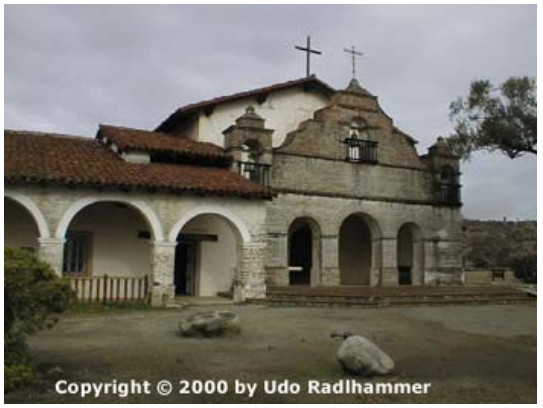
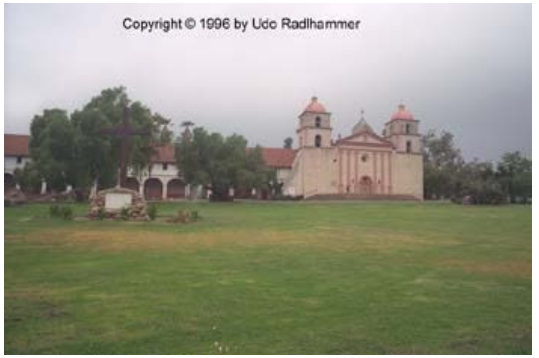
“Getting Into the Weeds”

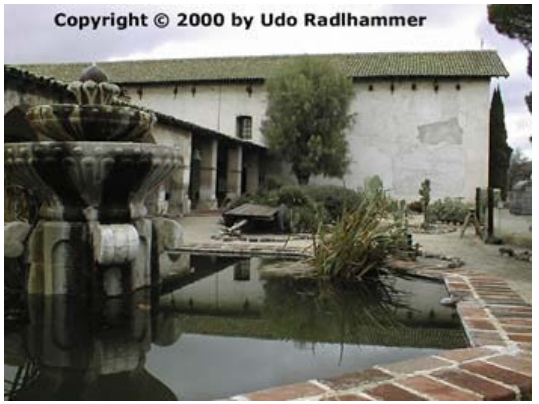
- Understand the ecology
- Understand the services
- Understand the risks
- Develop landscape goals

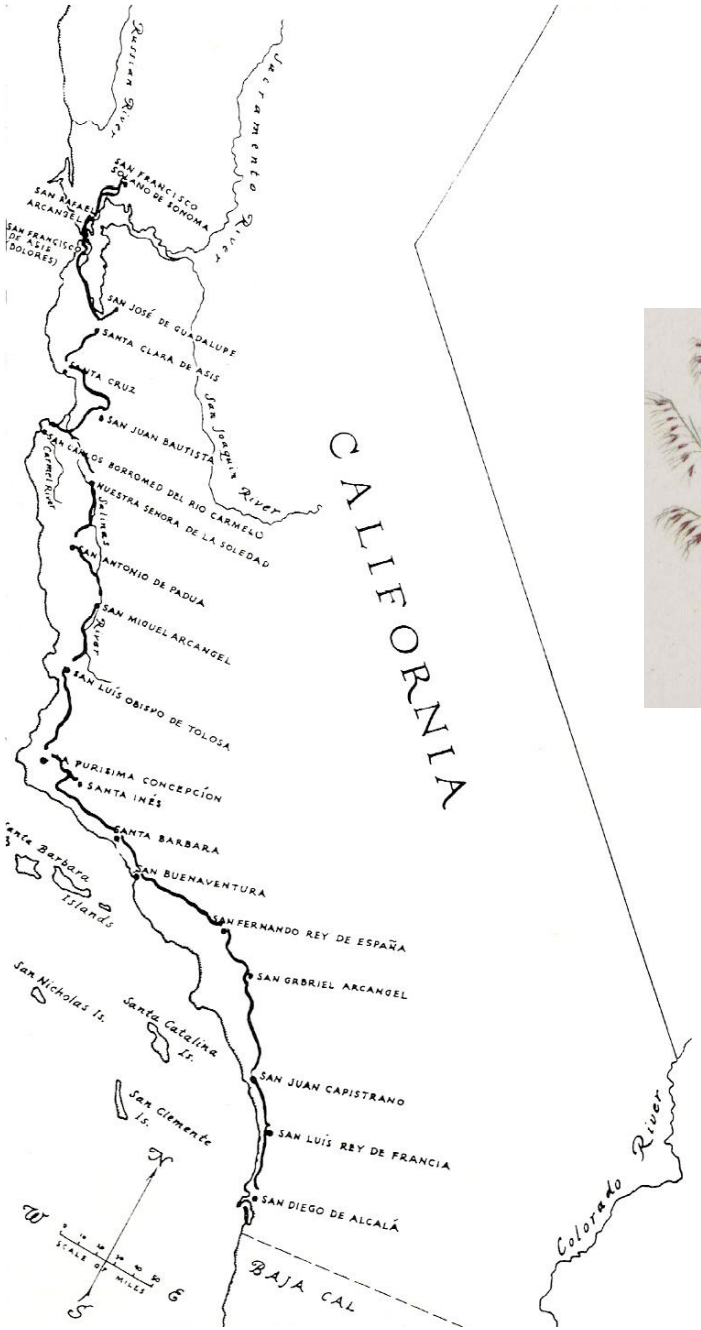


Spanish missions in California were established from 1770 – 1823.



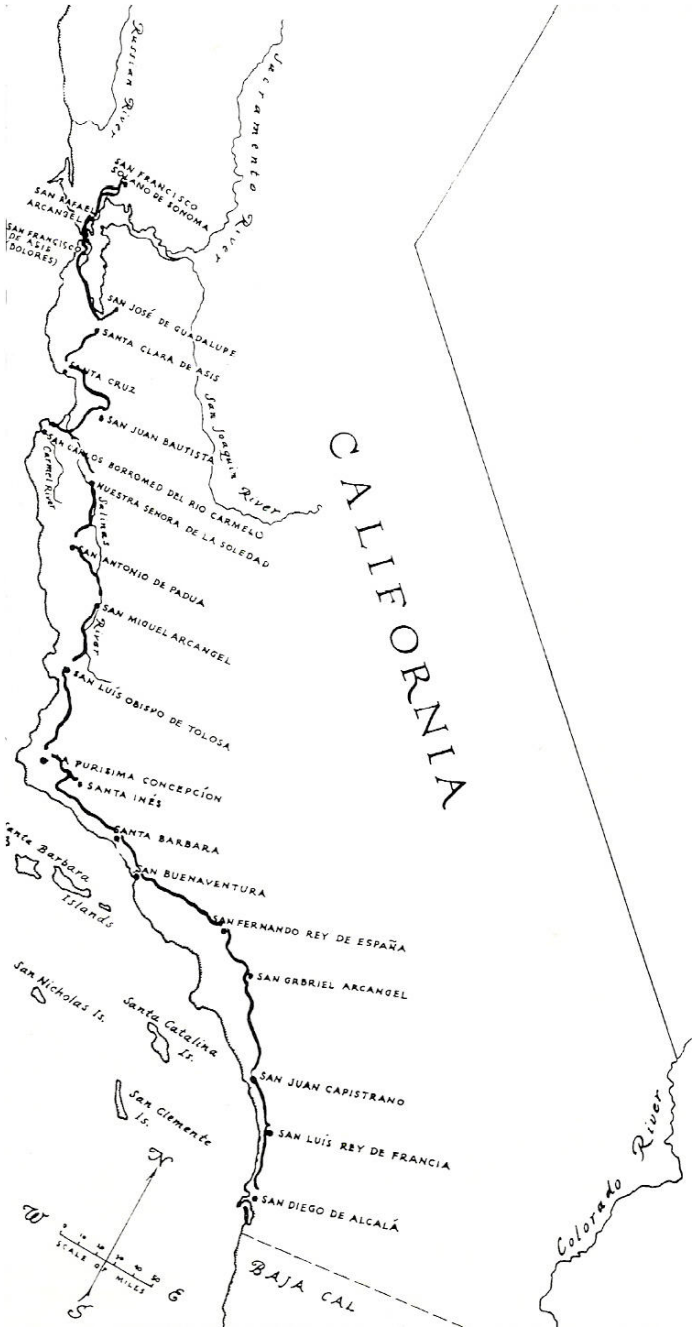






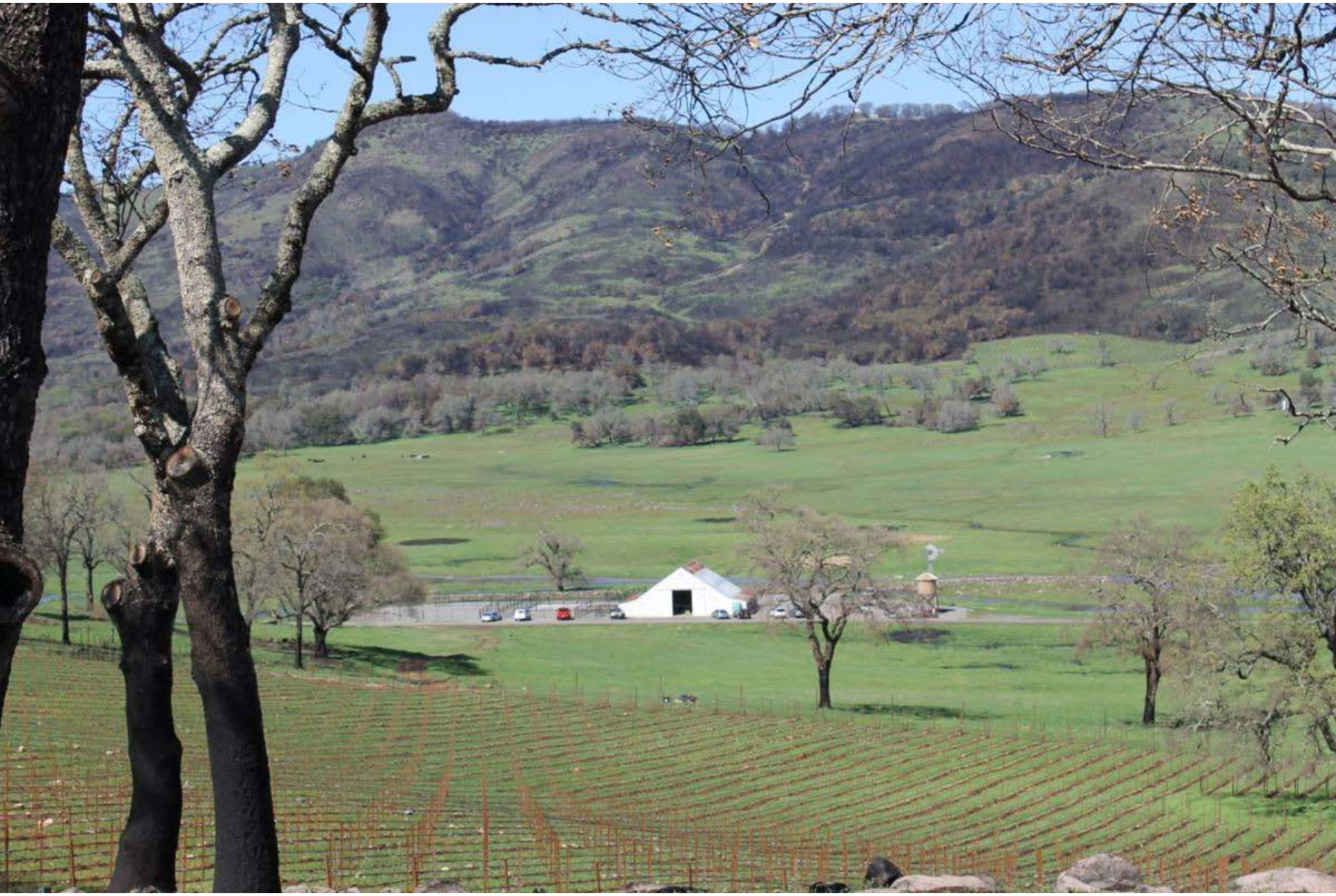
Native plant species were predominantly perennial bunch grasses and annual forbs.

Forage species introduced by the Spanish.

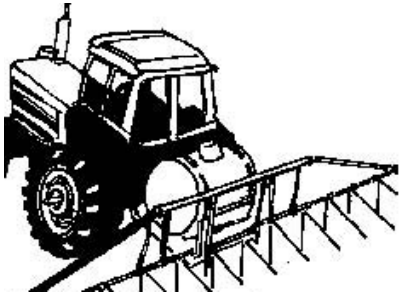


Reality of Exotic Annuals

- Here to stay
- Exotic annuals are better adapted to grazing.
  - Forage quality
  - Frequency of grazing
  - Intensity of grazing
  - Productivity
- We cannot go back to a “natural” state.
- Manage for objectives with disturbance




TOOLS



What about weed control?

Taeniatherum caput-medusae - medusahead

Aegilops triuncialis- barbed goatgrass

Centaurea solstitialis - yellow star-thistle

Summer medusahead cover at plots in Fresno and Yolo cos. after first year treatments

Plateau (imazapic)

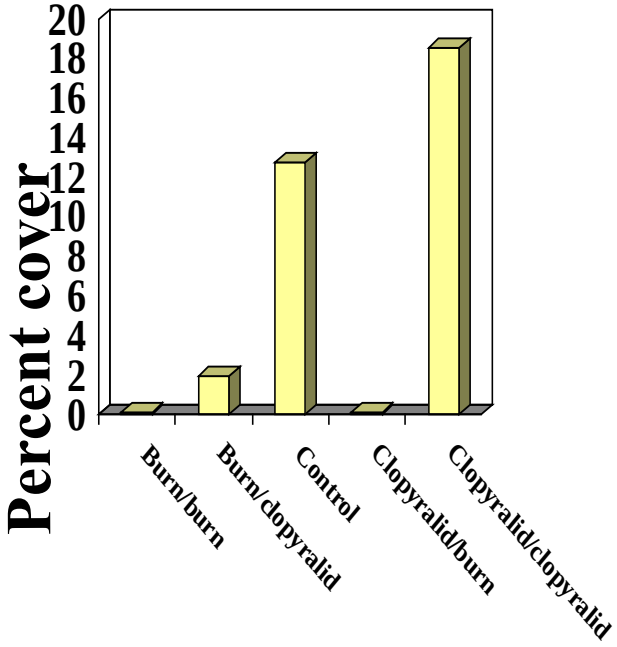
	Lbs/A	
County	Fresno Co.	Yolo Co.
Untreated check	50 a	79 a
Reveg only	26 b	67 ab
Burn only	1 c	11 c
Treated 1 oz ae/A	3 c	74 a
Treated 3 oz ae/A	4 c	45 b
Treated 1 oz ae/A + reveg	2 c	79 a
Treated 3 oz ae/A + reveg	1 c	58 ab
Burned, treated 1 oz ae/A	0 c	2 c
Burned, treated 3 oz ae/A	0 c	0 c
Burned, treated 1 oz ae/A + reveg	0 c	6 c
Burned, treated 3 oz ae/A + reveg	0 c	0 c

Spring broadleaf forb cover at plots in Fresno and Yolo cos. after first year treatments

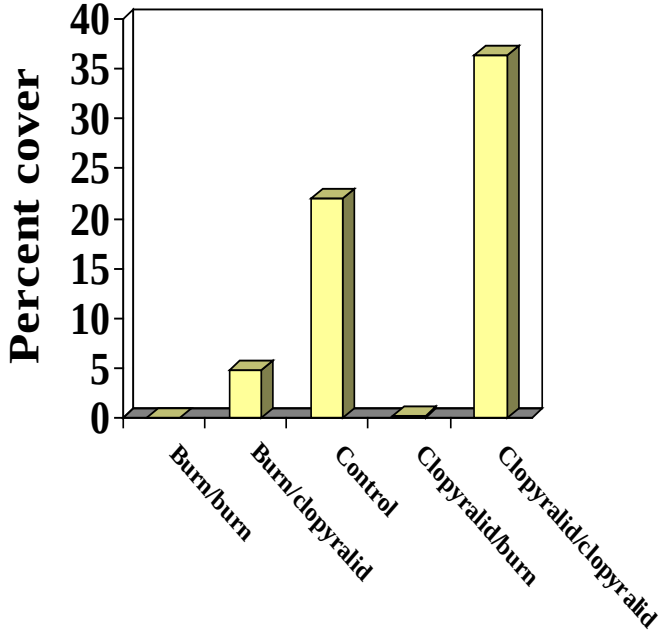
Plateau (imazapic)

	Percent cover of all broadleaf forbs			
County	Fresno Co.		Yolo Co.	
Untreated check	26	c	35	cd
Reveg only	78	ab	22	d
Burn only	102	a	111	a
Treated 1 oz ae/A	40	c	71	b
Treated 3 oz ae/A	28	c	73	b
Treated 1 oz ae/A + reveg	45	bc	65	bc
Treated 3 oz ae/A + reveg	59	abc	65	bc
Burned, treated 1 oz ae/A	60	abc	100	ab
Burned, treated 3 oz ae/A	40	c	74	a
Burned, treated 1 oz ae/A + reveg	41	bc	113	a
Burned, treated 3 oz ae/A + reveg	56	bc	80	ab

Medusahead

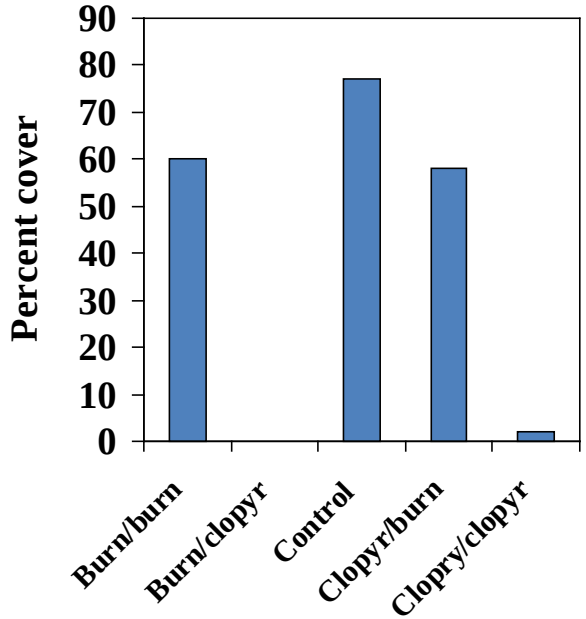


Ripgut brome

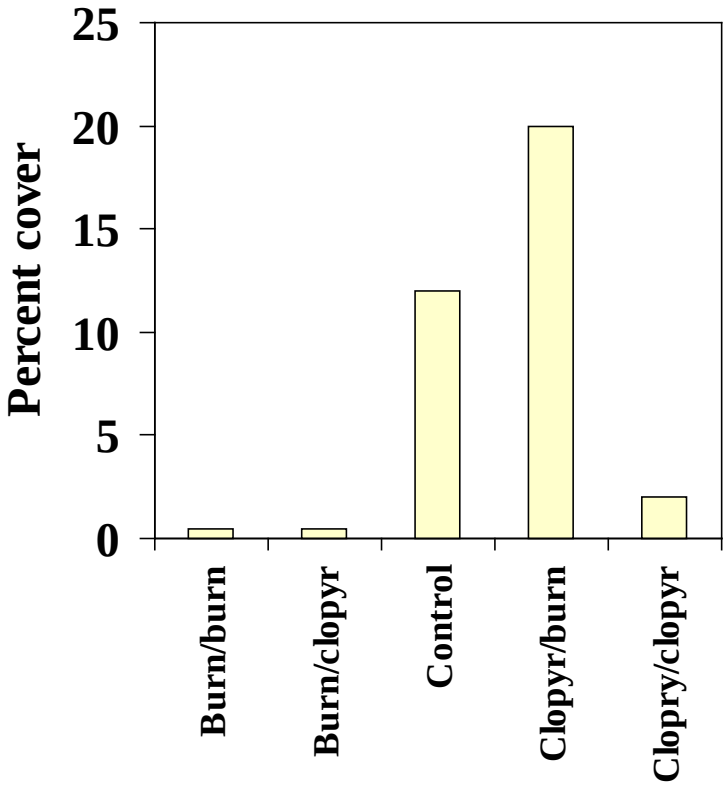


Yellow starthistle cover following two years of control

San Benito County



Yuba County



What about emissions?

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Atmospheres

RESEARCH ARTICLE
10.1002/2016JD026315

Special Section:
Quantifying the Emission, Properties, and Diverse Impacts of Wildfire Smoke

Airborne measurements of western U.S. wildfire emissions: Comparison with prescribed burning and air quality implications

Xiaoxi Liu[1,2,3], L. Gregory Huey[1], Robert J. Yokelson[4], Vanessa Selimovic[4], Isobel J. Simpson[5], Markus Müller[4,6], Jose L. Jimenez[7,8], Pedro Campuzano-Jost[7,8], Andreas J. Beyersdorf[9,10], Donald R. Blake[5], Zachary Butterfield[11,12], Yonghoon Choi[9,13], John D. Crounse[14], Douglas A. Day[7,8], Glenn S. Diskin[9], Manvendra K. Dubey[11], Edward Fortner[15], Thomas F. Hanisco[16], Weiwei Hu[7,8], Laura E. King[1], Lawrence Kleinman[17], Simone Meinardi[5], Tomas Mikoviny[18], Timothy B. Onasch[15], Brett B. Palm[7,8], Jeff Peischl[7,19], Ilana B. Pollack[7,19,20], Thomas B. Ryerson[19], Glen W. Sachse[9], Arthur J. Sedlacek[17], John E. Shilling[21], Stephen Springston[17], Jason M. St. Clair[14,22,23], David J. Tanner[1], Alexander P. Teng[14], Paul O. Wennberg[14,24], Armin Wisthaler[6,18], and Glenn M. Wolfe[16,25]

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Key Points:
- Emission factors (EFs) were measured for three western wildfires for major gases and particles and rarely measured OVOCs and organic nitrates
- Aircraft-measured EF(PM_1) from wildfires is more than 2 times that of prescribed fires
- Emission estimates for western U.S. wildfires indicate a significant BB contribution to aerosol mass

Supporting Information:
- Supporting Information S1

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Citation:
Liu, X., et al. (2017), Airborne measurements of western U.S. wildfire emissions: Comparison with prescribed burning and air quality implications, *J. Geophys. Res. Atmos.*, *122*, 6108–6129, doi:10.1002/2016JD026315.

Received 6 DEC 2016
Accepted 20 APR 2017
Published online 14 JUN 2017

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Abstract Wildfires emit significant amounts of pollutants that degrade air quality. Plumes from three wildfires in the western U.S. were measured from aircraft during the Studies of Emissions and Atmospheric Composition, Clouds and Climate Coupling by Regional Surveys (SEAC^{4}RS) and the Biomass Burning Observation Project (BBOP), both in summer 2013. This study reports an extensive set of emission factors (EFs) for over 80 gases and 5 components of submicron particulate matter (PM_1) from these temperate wildfires. These include rarely, or never before, measured oxygenated volatile organic compounds and multifunctional organic nitrates. The observed EFs are compared with previous measurements of temperate wildfires, boreal forest fires, and temperate prescribed fires. The wildfires emitted high amounts of PM_1 (with organic aerosol (OA) dominating the mass) with an average EF that is more than 2 times the EFs for prescribed fires. The measured EFs were used to estimate the annual wildfire emissions of carbon monoxide, nitrogen oxides, total nonmethane organic compounds, and PM_1 from 11 western U.S. states. The estimated gas emissions are generally comparable with the 2011 National Emissions Inventory (NEI). However, our PM_1 emission estimate (1530 ± 570 Gg yr^{-1}) is over 3 times that of the NEI $PM_{2.5}$ estimate and is also higher than the $PM_{2.5}$ emitted from all other sources in these states in the NEI. This study indicates that the source of OA from biomass burning in the western states is significantly underestimated. In addition, our results indicate that prescribed burning may be an effective method to reduce fine particle emissions.

Conclusions

- Our “natural” landscapes require disturbance
- Focus on the goals of the landscape
- Fire is one vegetation management tools
- Properly timed fire can control noxious weeds
- Prescribed burns vs. wildland fires

Questions

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