

Where there's smoke... there's social science! Public perceptions of smoke & communication from multiple regions



Stacey Sargent Frederick
Program Coordinator
California Fire Science Consortium
Office: (510) 642-4934
ssfrederick@berkeley.edu

Outline

Oregon smoke settles in the valley



- Smoke Background
- Stage 1: Interviews
- Stage 2: Questionnaires
 - Bonus longitudinal study
- Stage 3: Experimental design
- Additional works of interest
- Acknowledgements

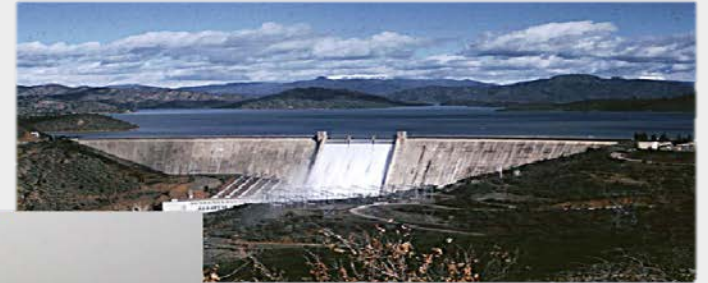


Background

- Impacts of smoke to people
- Impacts of smoke on forest management



**South Carolina 3
years after
prescribed burn**



Shasta Dam, California



Smoke Literature Major Findings

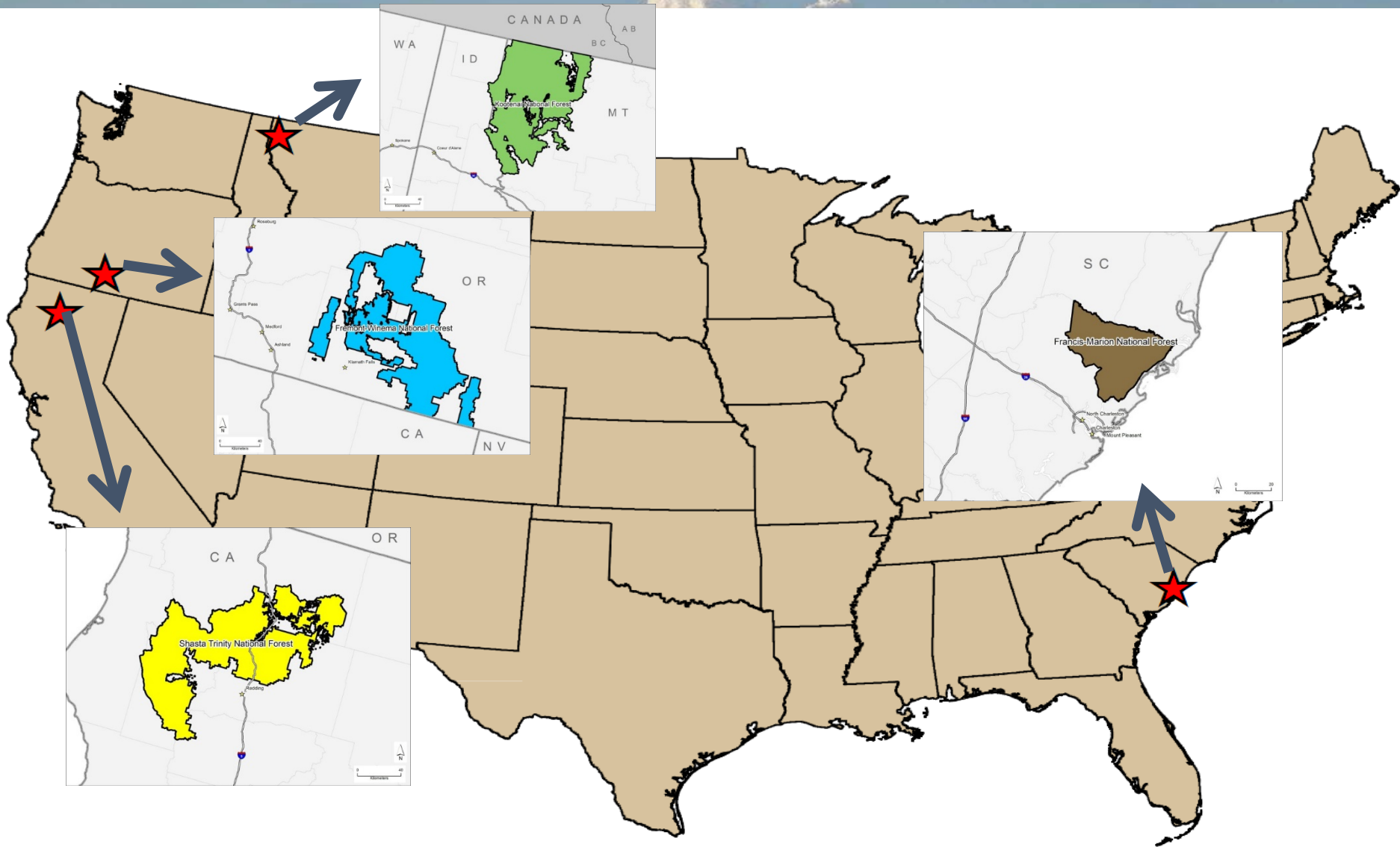
- Acceptance of prescribed fire Citizen concern and acceptance
- Smoke origin
- Respiratory ailments
- Prescribed fire smoke vs. wildfire smoke



Overview



A multi-region and multi-stage analysis of smoke and
fire social science



Stage I: Interviews



Semi structured interviews with responses sorted and summarized.

Interview Findings

Table 1 Number and type of interview participants

#	Participant type
16	Federal Agency
15	State or Local Agency
6	Air Quality
6	Local Fire Protection
4	Timber Industry
5	Environmental Non-Governmental Organization
8	Private Landowner
60	Total Interviewees

Variety of communication tools and strategies

Collaborative and facilitated groups

Challenges to smoke communication

Stage 2: Questionnaires

Public Opinions about Smoke from Wildfire and Land Management Activities



A Survey of Citizens in Northern California

This questionnaire was developed by researchers at The Ohio State University and Oregon State University. The findings will be summarized to help forest managers and scientists better understand citizens' opinions of smoke management from fires. We are asking for your help because you live near public and private lands where management practices may result in smoke.

The first set of questions is about general land and smoke management. These are followed by questions about your trust in and communication with land and air management agencies. Finally, we ask a few questions about you so that we can better understand who our respondents are. All responses are confidential.

Oregon State
UNIVERSITY
College of Forestry



Methods & Respondents



- Modified Dillman approach survey, mailback survey
- N=992 received (23% response rate average; site response rate 13-33%)
- Site differences minimal, combined
- Predominantly older, Caucasian with some college education.

Bonus Study! Graduate Research Innovation Grant (GRIN)

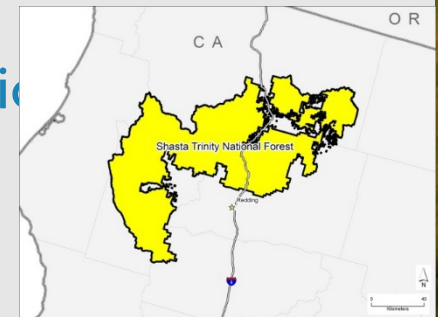
A smoky day in southern Oregon



Longitudinal Panel Study for one site

Methods

- Longitudinal panel study:
 - Same individuals, same questions, different points in time
 - Study changes *over time*
 - Establish *social trends* after stimulus (active fire season)
 - *Uncommon* in natural resource social science
- Responses and analysis:
 - Mail-back questionnaire (condensed version)
 - n=146 (61% response rate)
 - Test between 2012 and 2013 data



The 2012 Fire Season

- 3 large (over 25,000 acres) fires burned
 - Ponderosa Fire, Bagley Fire, and the Reading Fire
- Numerous small fires (<5,000 acres) and medium fires
- Smoke and Air Quality warnings



Samantha Robinson – Redding.com



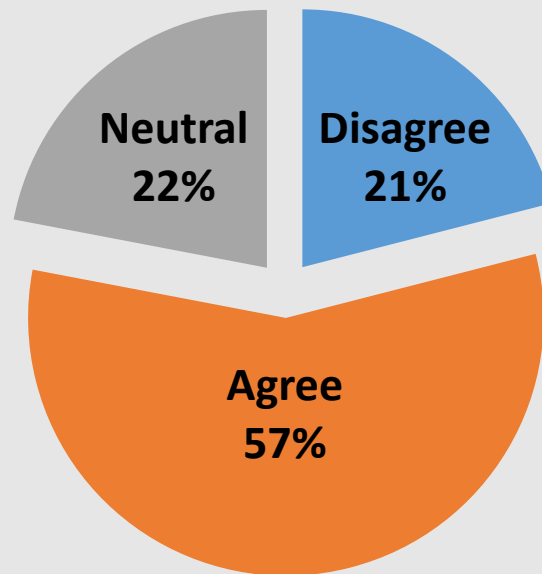


Respondents:

- Similar demographics to first survey
- 30% have respiratory ailment
- 30% in a community with a CWPP
- 84% rated chance of wildfire near home in next 5 years as likely


Source of Smoke

- Most (71%) identify source of smoke
- Source of smoke influences acceptance



Social Acceptability

How do you define it?

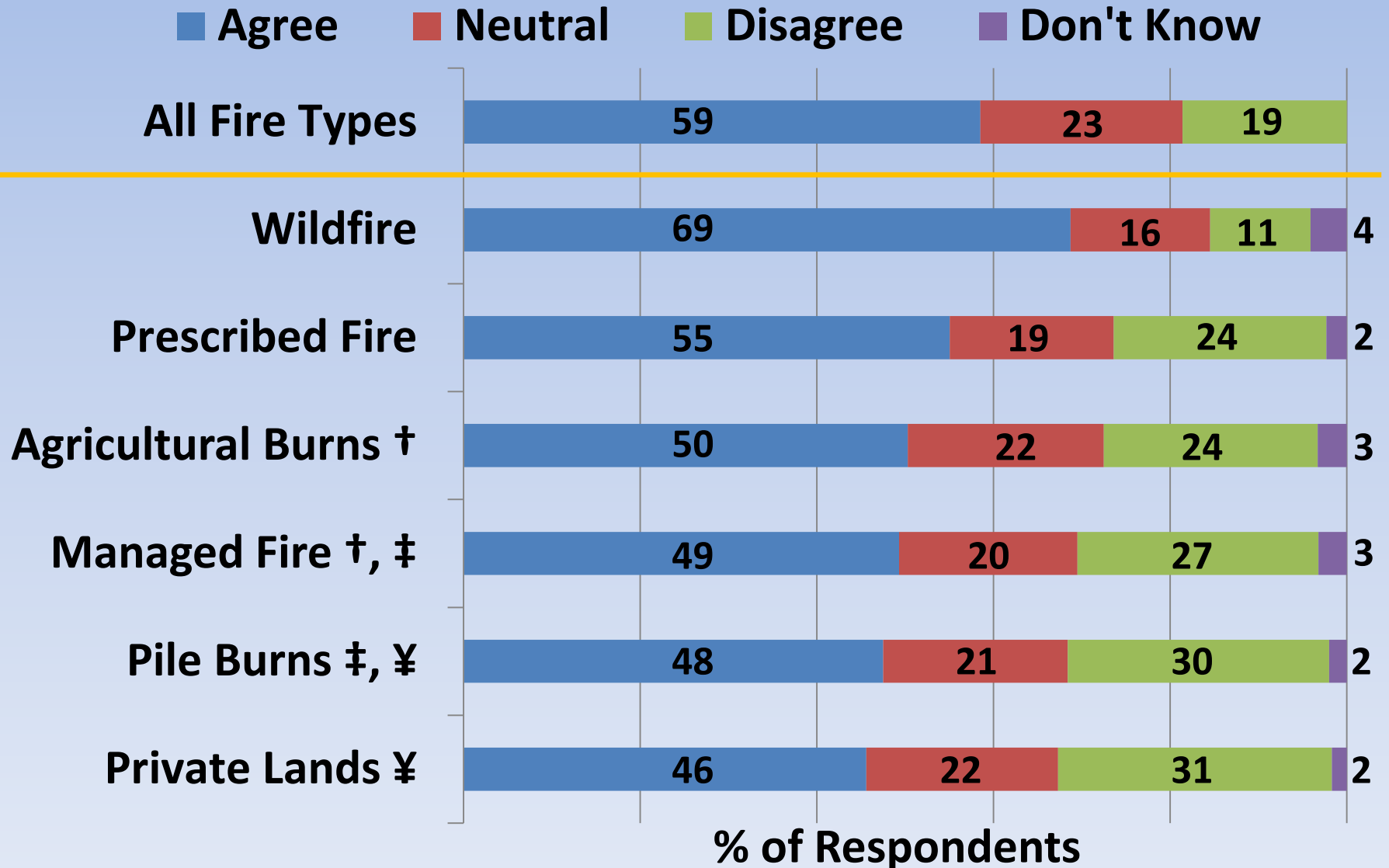
- Compare alternatives  select favorable ones
- Affective and cognitive



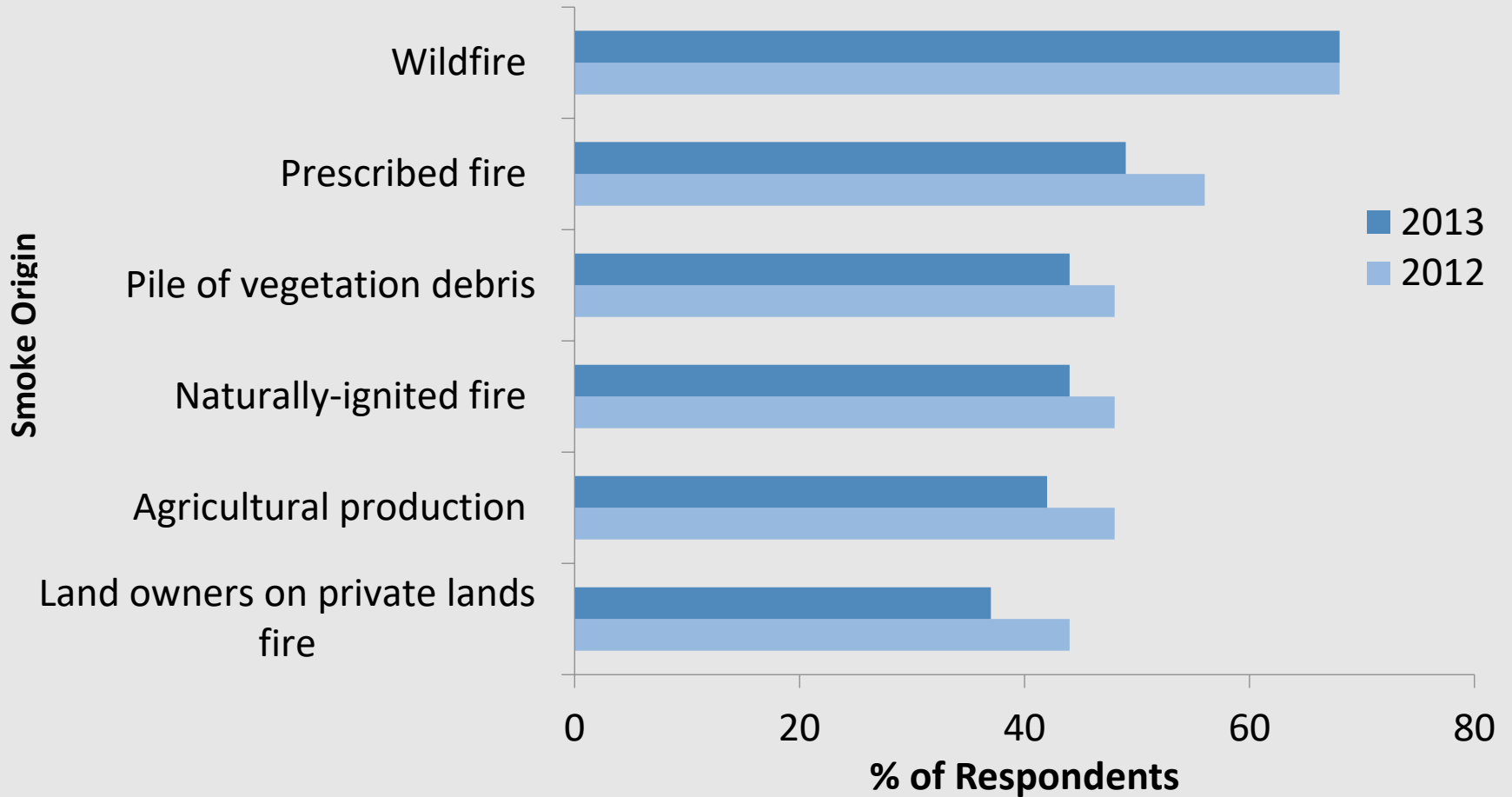
Why does it matter?

Lead to better agency-public relations
Less time/money fighting the public
Public management

Acceptance of Smoke

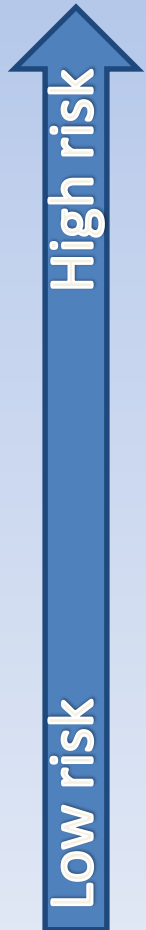


Smoke Acceptance by Origin- California



Perceptions of Smoke Risk

- 8 risk items - likelihood x severity

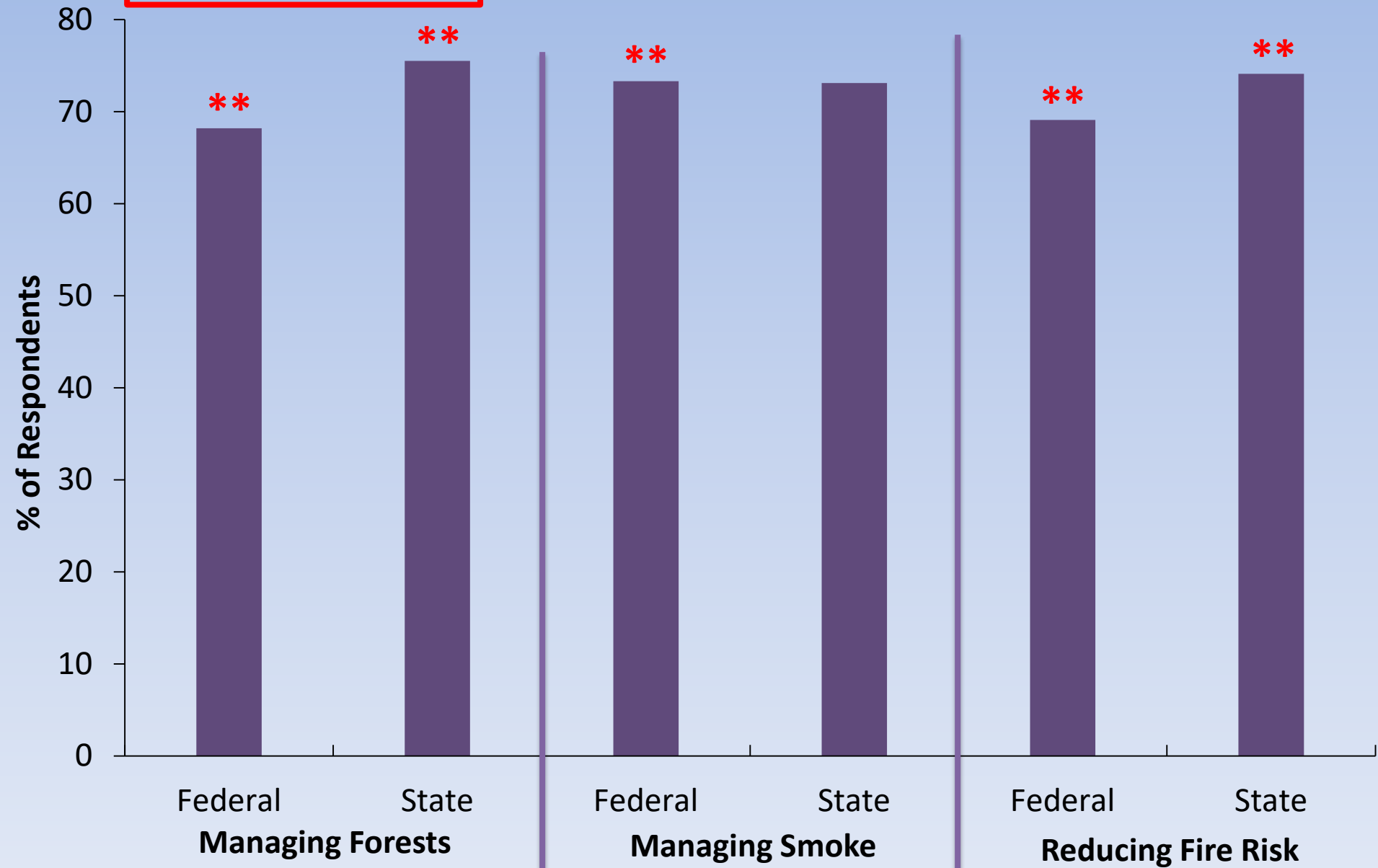


1. Family's health (*moderate risk*)
2. My health
3. Negative impacts to scenery
4. Reduced tourism
5. Reduced opportunities for rec participation
6. Reduced ability to accomplish activities on my property
7. My travel (road closures)
8. My ability to work (*low risk*)

Agency Ratings

1 = Poor, 7 = Excellent
4+ is graphed

**** Decreased
after fires in CA**



What influences smoke acceptance?

- Smoke sources included different sources of smoke(dependent variable)
- Sources of influence included demographics, perceptions of management activities, and of experiences (independent variables)



What influences smoke acceptance? - Findings

- Risk and Impacts
- Agency confidence and prescribed fire benefits
- Differing influences for different smoke sources
- How well did this models work?

A landscape photograph showing a green field in the foreground, a line of trees in the middle ground, and mountains in the background under a blue sky with a large, white, fluffy cloud. The text is overlaid on the image in white boxes.

Stage 3: Experimental design

Experimental design to examine effects of message framing on knowledge, beliefs, and attitudes toward smoke emissions management and prescribed burning and how people were seeking their information about such topics.

Methods

- Experimental design completed with online panel
 - Distributed to established panel
 - Qualtrics survey
- Pre-test survey → Exposure to message → Post-test survey
- N=1009
 - ~340 participants per site
 - >45 participants per treatment

Findings – Pre-treatment

- Gender: Majority of participants female
 - CA: 69%, OR: 72%, SC: 72%
- One-fourth had recent experience with fire (last 5 years)
 - CA: 30%, OR: 20%, SC: 15%
- More than two-thirds had negative experience with smoke (last 5 years)
 - CA: 78%, OR: 74%, SC: 58%
- Around one-third had a household member with a respiratory ailment
 - CA: 37%, OR: 37%, SC: 30%

Summary of changes following information exposure

- Increase in:
 - Acceptance
 - Prescribed fire
 - Smoke from prescribed fire
 - Worry
 - Wildfire
 - Beliefs about prescribed fires
 - Less smoke compared to wildfires
 - Benefits > costs
 - Knowledge
 - Current information
 - Desired information
- Decrease in:
 - Worry
 - Prescribed fire
 - Smoke emissions health impact
 - Personal
 - Household
 - Expected harm
 - Personal
 - Family
 - Community
 - Other communities
 - Knowledge
 - Information (in)sufficiency

Conclusions

- Relatively high levels of concern and perceived personal impacts from smoke emissions from WUI residents
- All messages resulted in increased acceptance, beliefs, understanding and a decrease in hazard perceptions (except wildfire worry)
- Abstract messages generally associated with more acceptance, lower perceived risks, and more understanding compared to other frames
 - Likely influenced by audience characteristics (prior knowledge and experience with fire and smoke emissions)
- Effectiveness increased by aligning message frames with communication goals

A landscape photograph showing a wide, green field in the foreground. In the middle ground, there is a dense line of evergreen trees. In the background, there are several mountain peaks under a blue sky with scattered white clouds. A large, prominent, white, puffy cloud is visible in the center of the sky, partially obscuring the mountains behind it.

Dual data sets, multi-regional analysis

Data from Stage 2 (Questionnaire) and parallel study combined

Methods

- Study 1 (presented on)
- Study 2 added 4 additional state datasets (MT, LA, TX, ID)
- N=2906 with 6-30% response rates
- Tolerance vs. acceptance & wording

Findings

- Smoke source
 - Overall more than 50% of the combined respondents indicated acceptance/tolerance for smoke from all sources
 - One exception of Montana's with managed fire
- Limited differences between states and rural vs. urban
- Experiences with smoke and health impacts

A landscape photograph showing a vast, green grassy field in the foreground. In the background, there are some trees and a distant mountain range under a clear blue sky. A large, white, puffy cumulus cloud is the central focus of the sky, with some smaller clouds to its right. A white rectangular box is overlaid on the middle of the image, containing the text "Overall Conclusions" in a blue, sans-serif font.

Overall Conclusions

What we learned

- Acceptance moderate, many neutral
 - Uncontrollable or for greater good most accepted
- Smoke source matters
- Where differences do/don't exist
- Education and relationships



Sequoia NP – wildfire smoke

Management Implications- Knowledge is power

- Knowing Acceptance of smoke
 - Smoke Acceptance is moderate but source/situation dependent
- Influencing acceptance
 - Change the balance between perceived risks and benefits
 - Increasing knowledge, communication, and confidence in agencies to manage smoke
 - Information exposure

Management Implications- Communication

- Use many strategies
- Message strategies
- Target at-risk groups
- Build confidence through action
- For those who's health is affected
 - Trade-off between prescribed fire smoke and wildfire smoke
 - Information pre-smoke production

Additional Work and Resources

- JFSP Smoke Science Plan
- Smoke Synthesis- 36 articles

Thanks to...

Dr. Eric Toman

Dr. Christine Olsen

A. Paige Fischer

Danielle Mazzotta

Kathleen Rose

Devyani Singh



Questions



Flickr: Shasta-Trinity NF Fire

	Wild
Health risk	
Other risk	
Health impact	
Other impact	
Confidence	POS
Communication	
Rx Benefits	
Knowledge	
Age	NEG
Education	
Female	
Rural	
R ²	0.13

	Wild	Rx Fire	Ag Burn	Managed	Pile Burn	Private Burn
Health risk		NEG	NEG		NEG	NEG
Other risk		NEG		NEG		
Health impact			NEG			
Other impact				NEG		
Confidence	POS	POS		POS		
Communication						
Rx Benefits		POS	POS	POS	POS	
Knowledge						
Age	NEG	NEG		NEG		
Education		POS		POS		
Female						
Rural			POS		POS	POS
R ²	0.13	0.45	0.19	0.21	0.23	0.17

Summary

- Perceived smoke risk

A smoky day in southern Oregon



Photos courtesy of Danielle Mazzotta,
Lance Sargent, & Carl Skinner

What was linked to acceptance of smoke from wildfire, prescribed fire, naturally-ignited, and pile burns?

- Across the board, those with **high risk** from smoke were **less** accepting
- For all types except pile burns, those who had **more confidence** in federal and state agencies to manage smoke were **more accepting**
- **Higher education level and younger age** had **more acceptance** of smoke for prescribed and naturally-ignited fires
- **Belief in the benefits of prescribed** fire led to **more acceptance** of smoke from prescribed fires

The best model? **Prescribed fire**. The benefits vs. risks