An aerial photograph of a forest fire. A helicopter is in the upper center, dropping a stream of water onto the flames. The fire is a bright yellow and orange column rising from a dense forest of green trees. The sky is filled with thick, grey smoke.

# **ASSESSING WILDFIRE RISK MITIGATION OUTREACH STRATEGIES IN THE WILDLAND-URBAN INTERFACE**

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Clifford**

**University of Colorado Boulder**

# What is the Wildland-Urban Interface (WUI)?

- “Where humans and their development meet or intermix with wildland fuel.”
- Culturally, politically, economically diverse.
- Varying capacity to mitigate wildfire risk.



(DOI, 2001; Paveglio et al., 2008)

# Wildfire Risk in the WUIs of the American West

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- “Severe fires are not new to most forests in this region. What is new is the expanded Wildland-Urban Interface hazard to people and property and the high cost of suppressing fires for society.” (Sherriff et al., 2014)
- CO Front Range a “major WUI area.” Half of the WUI assigned to highest risk severity class.
  - Also one of six states predicted to have the greatest growth in WUI acreage from 2000-2030.
- Significant costs: 2002 Hayman Fire cost Denver Water \$26 million in reservoir dredging and watershed restoration.

(Theobald & Romme, 2007, Echenseher, 2012)

# Mitigating Fire Risk: Resource Challenges

LOCAL NEWS

## Western Governors' Association calls to end "wildfire borrowing"

By Jesse Paul

The Denver Post

POSTED: 08/19/2014 02:20:53 PM MDT | UPDATED: ABOUT A MONTH AGO

1 COMMENT

The Western Governors' Association in a letter last week urged U.S. Senate and congressional leadership, and President Barack Obama, to increase federal wildfire budgets so agencies can stop using fire prevention funds for fire suppression.

The association said the U.S. Forest Service is again on pace to utilize prevention funds for suppression — known as "fire borrowing" — in a season where Oregon, California and Washington have seen millions of acres of forestland burn.

"We end up robbing from the land managers," said Kevin Klein, Director of the Colorado Division of Homeland Security and Emergency Management. "We end up stealing from those [prevention] programs to fight the fire. Treating wildfires like we do with our other programs makes sense to me."



A plane drops fire retardant as firefighters battle a blaze in El Portal, Calif., near Yosemite National Park on Tuesday, July 29, 2014. Firefighters in the state are also battling another wildfire in the Sierra Nevada foothills east of Sacramento. (AP | Al Golub)

# Mitigating Fire Risk: A Collective Action Problem

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## ■ Individual Incentives

- “Free ride” on others’ wildfire risk mitigation efforts
- Wait to be rescued by government fire fighting efforts
- Externalize costs of wildfire risk via insurance, disaster assistance

## ■ Governance Challenges

- Top-down regulation not politically or logistically feasible
- Resource managers must come up with strategies that encourage the collective reduction of risk across the WUI

# Mitigating Fire Risk: A Collective Action Problem

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- Multi-scalar challenge
  - From individual lots to national forests
- Multijurisdictional challenge
  - Public and private lands
  - Local, state, federal entities
  - Private entities (individuals, HOAs, businesses, etc.)
  - NGOs (watershed groups, forest collaboratives, etc.)

# Research Questions

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- What is/isn't working in terms of communicating wildfire risk and promoting wildfire mitigation on private property across the WUI?
- Goal: Find biggest bang for resource managers' limited bucks.

# Research Design: Colorado Case Studies

## High Park Fire – 2012

- 87,284 acres and 259 homes burned
- Burned outside city of Ft. Collins Larimer County
  - Interviews – fire managers, leaders of watershed groups involved in wildfire risk mitigation
  - Focus Group – WUI residents



# Research Design: Colorado Case Studies

## Waldo Canyon Fire – 2012

- 18,247 acres and 347 homes burned, 2 deaths
- Burned in city of Colorado Springs and adjacent communities (city is 24% WUI)
  - Interviews – fire managers, leaders of watershed groups involved in wildfire risk mitigation
  - Focus Group – WUI residents



# Research Design: Survey

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- Wildfire professionals from 10 states in the West
  - AZ, CA, CO, ID, MT, NV, MN, OR
- Selected from:
  - Type I or II fire since 2012
  - Found contact info for fire managers or similar professionals that had jurisdiction in the burn areas
  - Federal, state, local
- 499 contacts / 132 completed surveys = 26.5% response rate

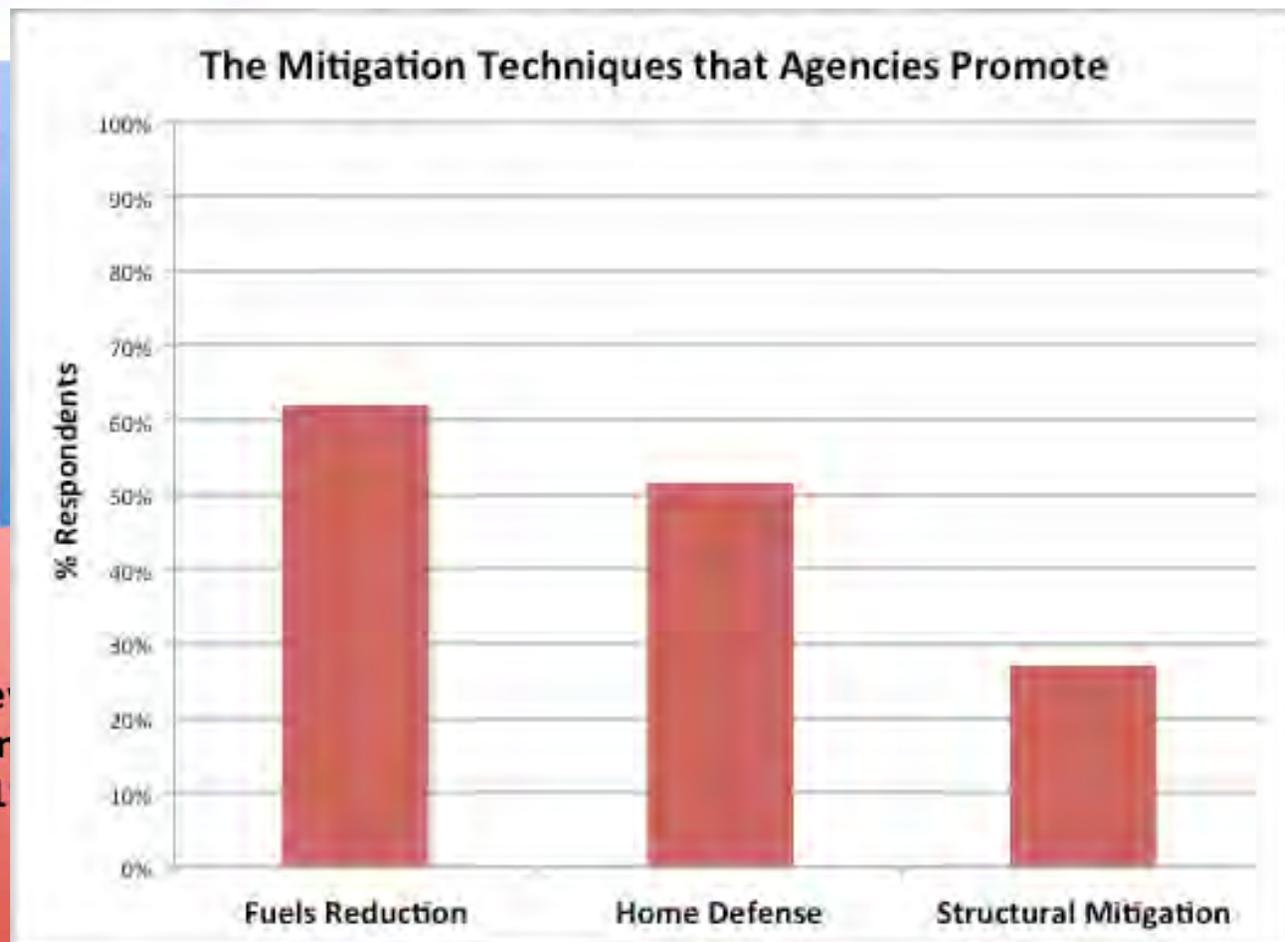
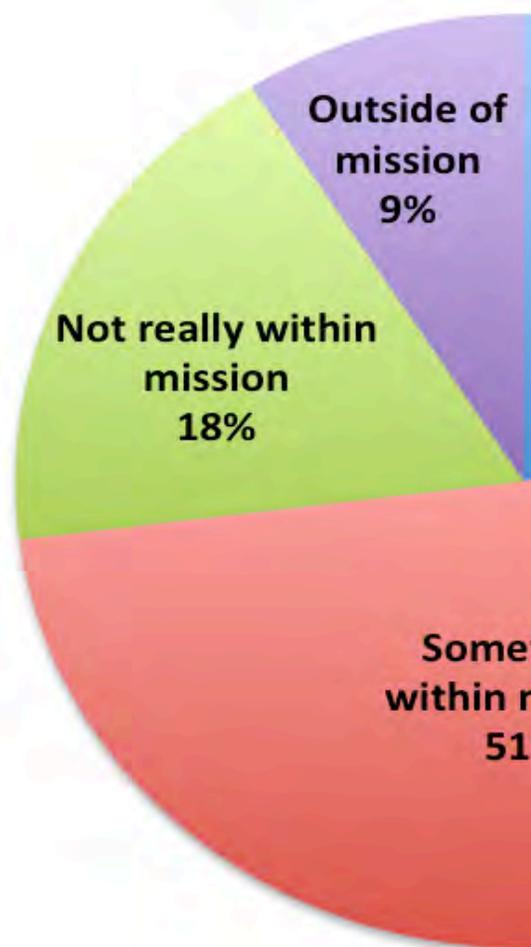
# Presenting Our Findings

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- Combining quantitative & qualitative findings:
  - What resource managers are doing versus what they think works the best and what residents are most receptive to.
  - Cross-checking resource managers' perceptions against residents' experiences.
  - What resource managers aren't doing that residents/NGOs (e.g., watershed groups) report as being successful.
  - The role of non-governmental organizations (e.g., watershed groups) in this multi-jurisdictional puzzle/collective action problem.

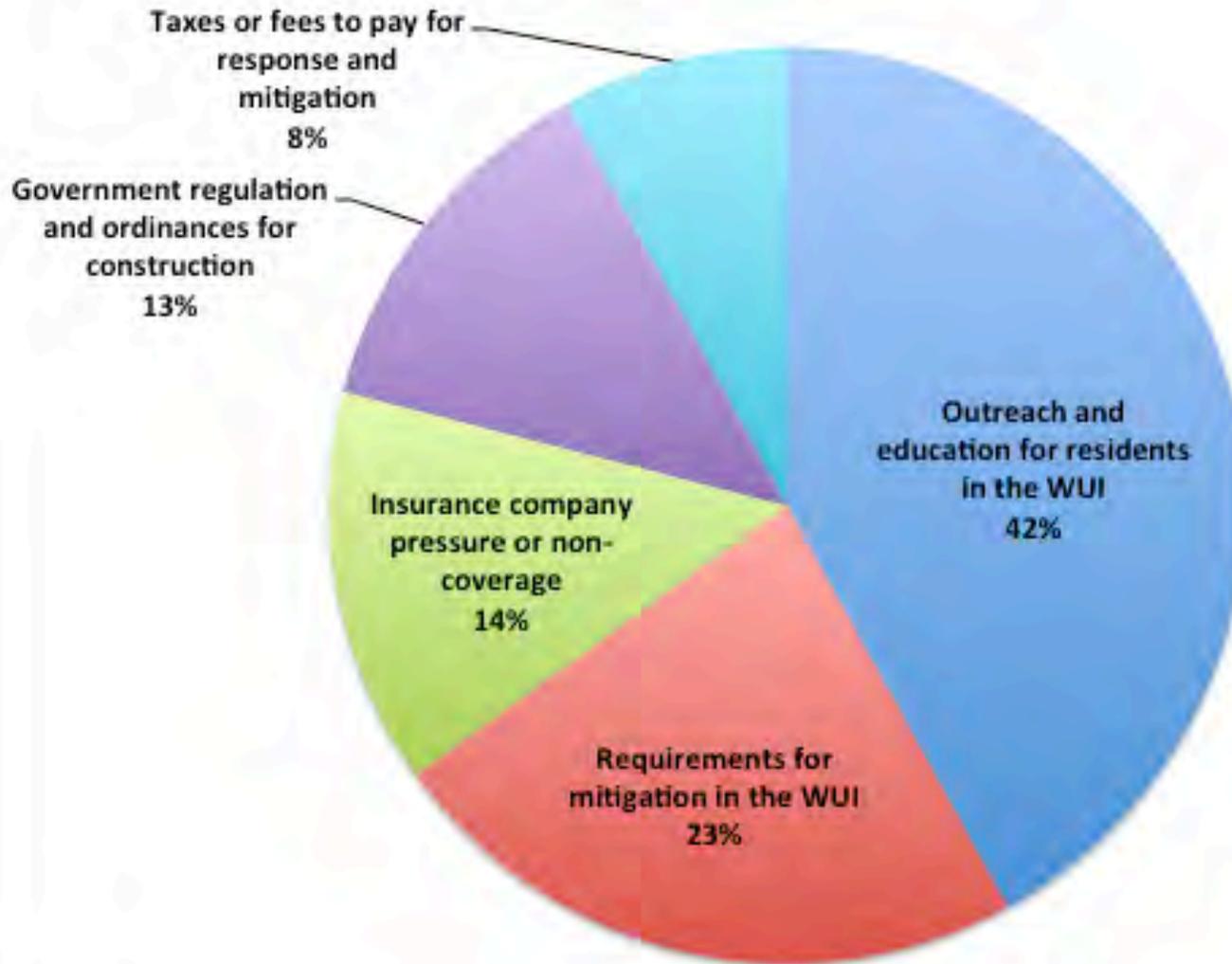
# Agencies' Commitments to Mitigating Wildfire Risk

## Importance of Mitigation to Agency's Mission



# Mitigating Wildfire Risk: Top-Ranked Approaches

Top-Ranked Approaches to Mitigating Wildfire Risk

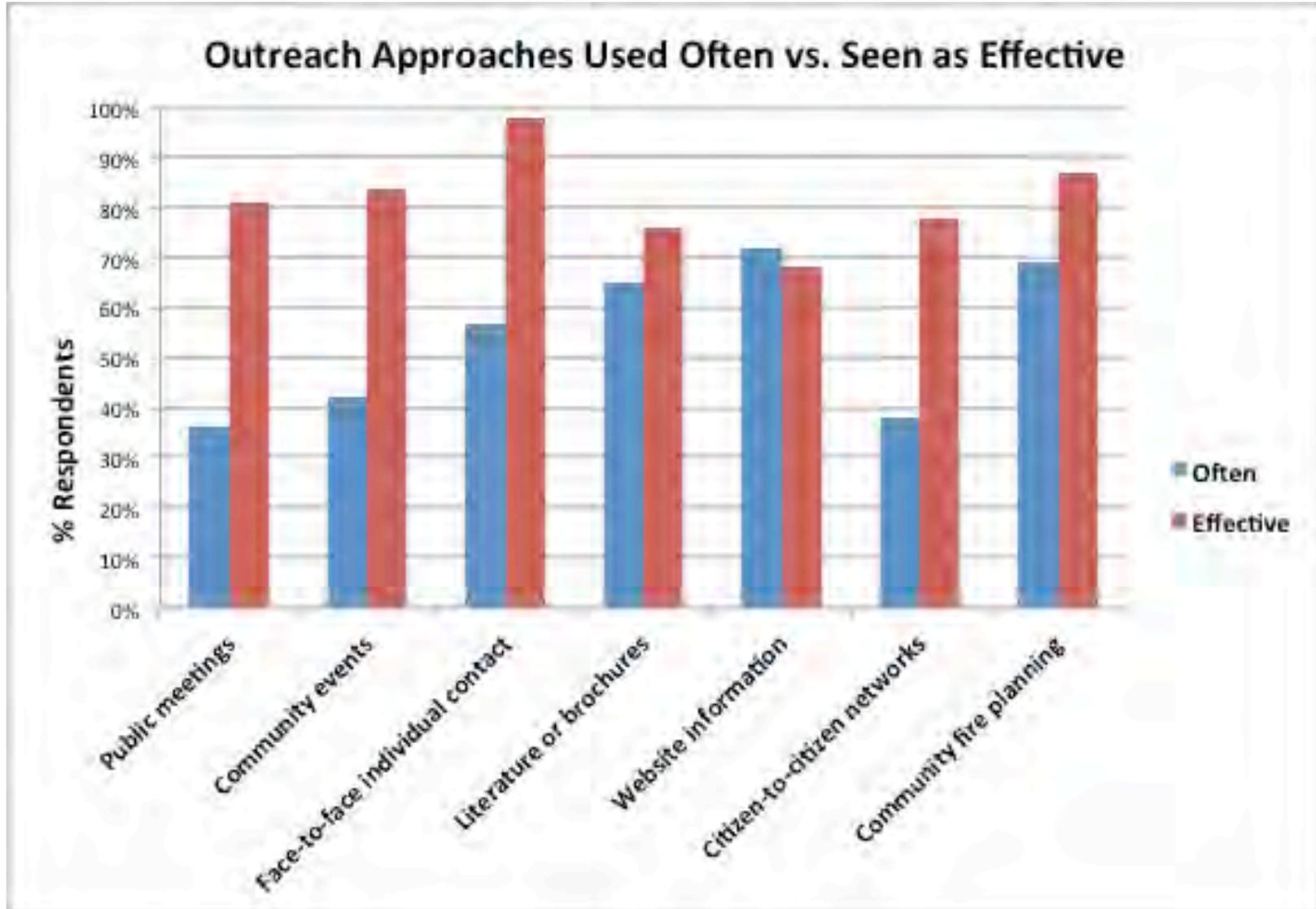


# Ordinances & Taxes: Perspectives

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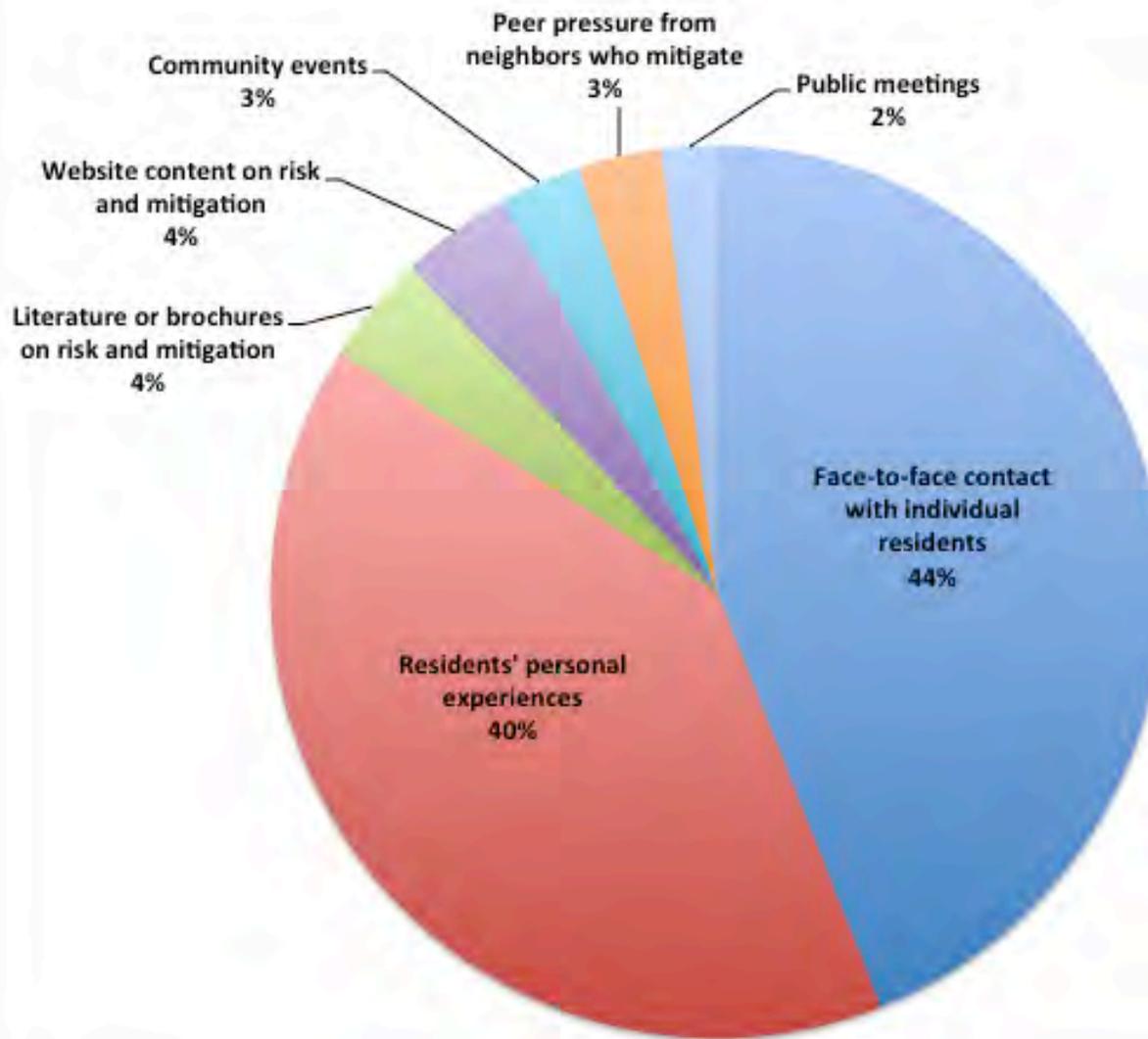
- Ordinances: "What we have is an existing problem. The ordinance only applies to reconstruction and new construction. **There's only about 8% of the hillside left that's able to be built on.**" (WC)
- Taxes: "... if you are willing to do a certain amount of work, you should get a reduction in your property tax... but, **most likely the tax reduction will not cover what you're gonna end up paying.**" (HP)

# Outreach & Ed: Frequency vs. Effectiveness



# Outreach & Ed: Top-Ranked Methods

Education and Outreach Approaches Ranked as Most Effective



# Outreach & Ed: Perspectives

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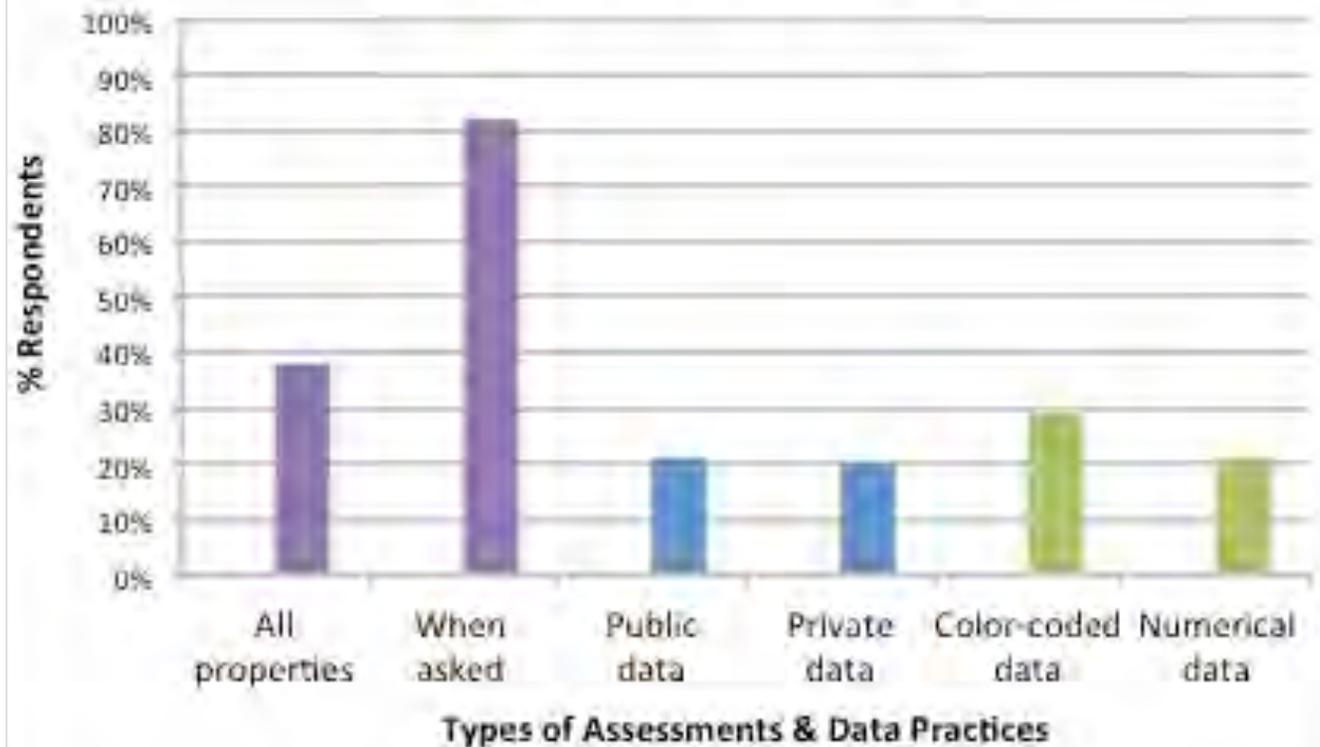
- Personal Experience: "When the Hayman burn occurred, **interest spiked, even though all we were doing was smelling the burn.**" (WC)
- Face-to-Face Contact: "We have people saying, 'I want you to come up and do this for me, but **I'm gonna call Fred.** I think that he would like this, too.' And pretty soon **Fred calls Denise and the next thing you know, we've got six people coming out to meet us saying, 'Yeah, come on in.'**" (HP)

# Risk Assessment: Perceptions and Practices

## Agency Approaches to Risk Assessment



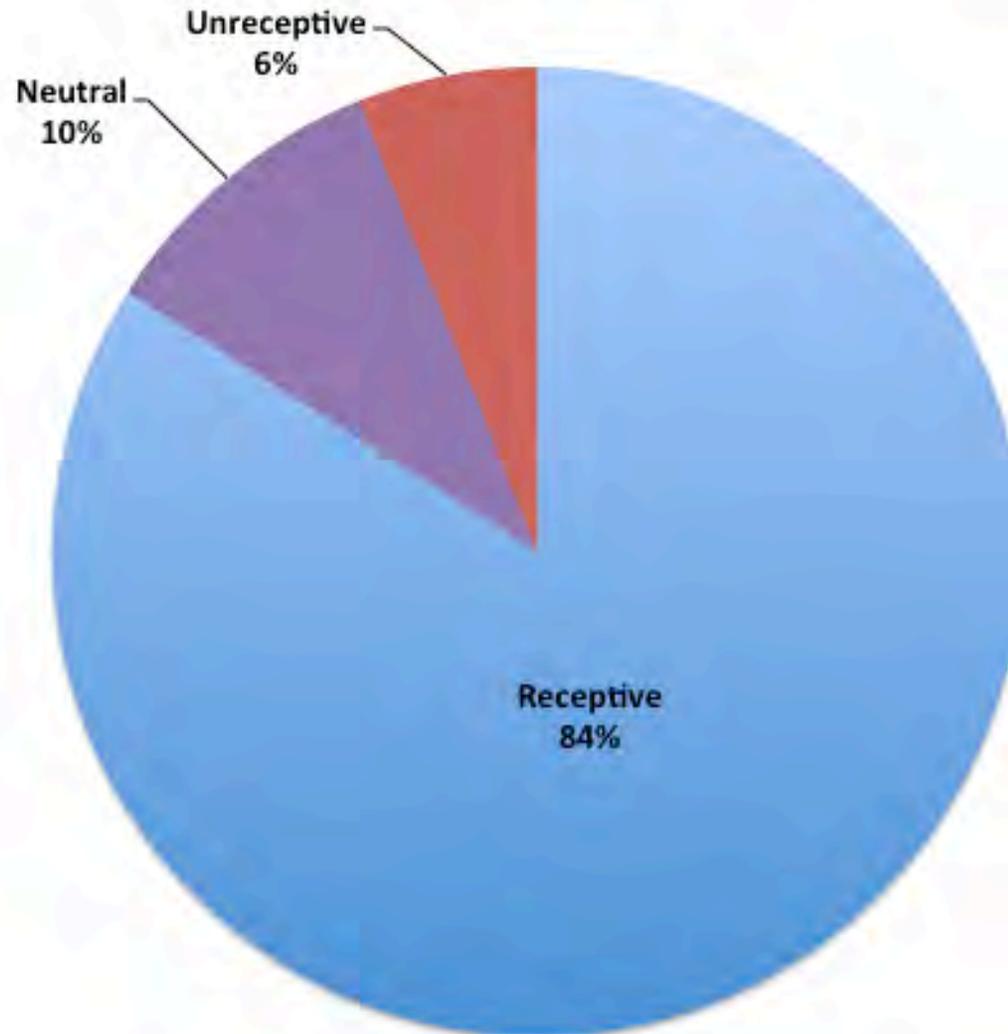
## Risk Assessment Methods



# Risk Assessment: Perceptions and Practices

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Residents' Receptivity to Risk Assessment,  
According to Resource Managers

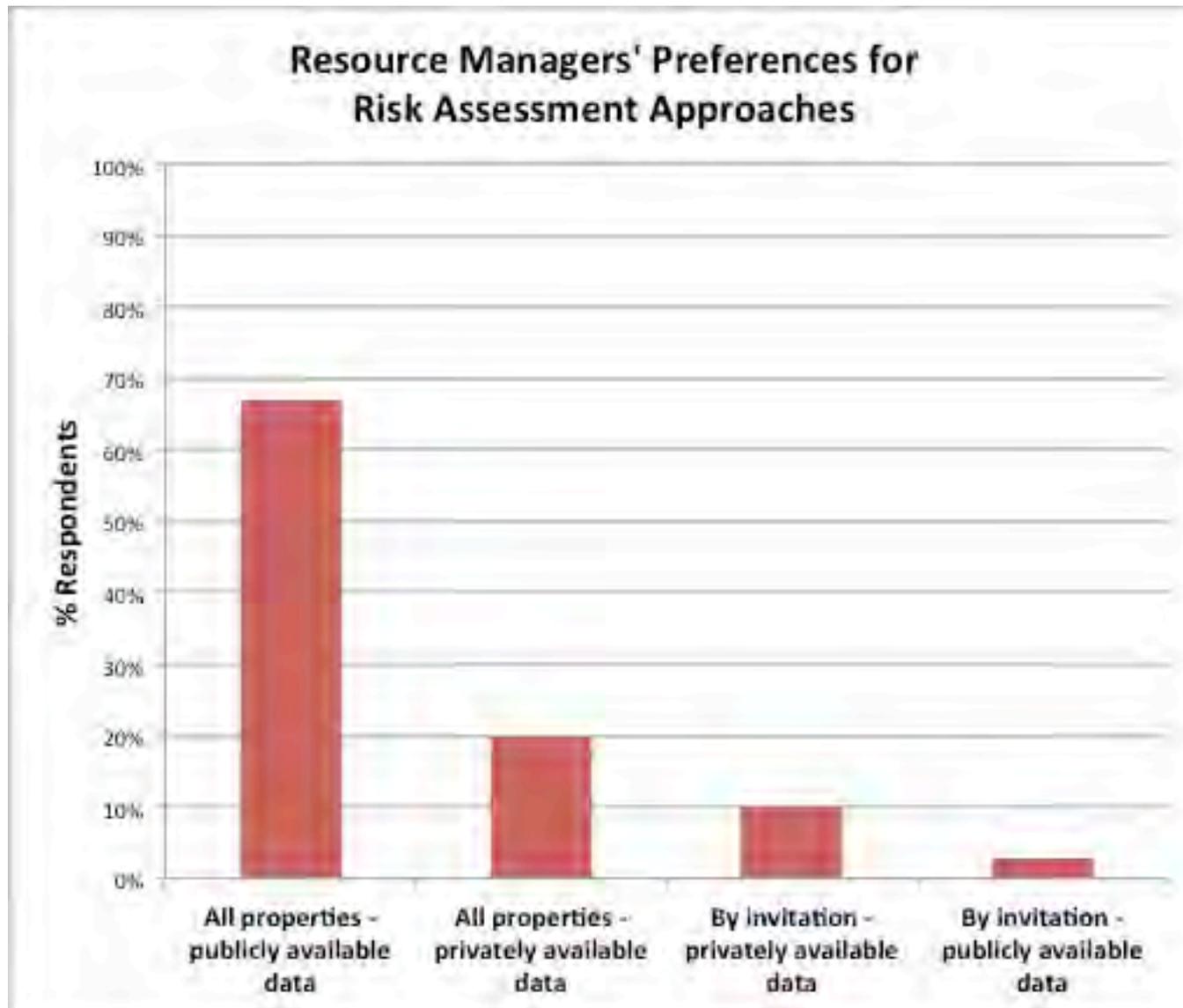


# Risk Assessment: Perceptions and Practices

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- “That map, almost everybody was aware of it. We keep a copy of it posted at the gate. **The fire department is a pretty constant presence up there.**” (WC)
- “There are like 10-12 residents up there who are on our department as volunteers and **they didn’t want us up there at all.**” (HP)

# Risk Assessment: Resource Managers' Wishes



# Discussion: Formal vs. Informal Governmental Role

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- Formal governance efforts
  - Ordinances, regulations, fees, taxes aren't top choice for resource managers or for residents
  - Risk assessment by government agencies is tricky – mixed execution, mixed receptivity, resource constraints
- Informal governance efforts
  - Face-to-face communication with WUI residents
  - Turning personal experience (i.e., close calls) into action
  - Encouraging writing of CWPPs
  - Citizen-to-citizen promotion of mitigation

# Who Supports Regulation/Taxes/Ordinances?

- Correlation between jurisdiction and support for a more formal, heavy-handed governmental role

## Correlation between Fire Agency Jurisdiction and Support for Government Regulations, Requirements, Taxes, or Ordinances

	Fire Jurisdiction
Support for Government Regulation	.188

\*. Correlation is significant at the 0.05 level (2-tailed)

# Who Supports Regulation/Taxes/Ordinances?

Variable	Regression Coefficient	SE	$\beta$	t	df	P
<b>Wildfire Experience</b>						
Montana	5.377	1.920	.382	2.80	1	.007
New Mexico	4.905	2.014	.282	2.44	1	.019
Washington	5.391	2.384	.244	2.26	1	.028
Hours per week/mitigation	.157	.084	.273	1.87	40	.067
Hours per week/outreach	-.030	.083	-.053	-.366	39	.716
Mitigation central to mission	.043	.567	.010	.076	4	.939
Pos. responses to <u>govt</u> rules	1.011	.497	.287	2.04	4	.047
Pos. responses to risk assess.	.179	.588	.036	.304	4	.762
Pos. response to grants/incentive	-1.255	.773	-.244	-1.62	4	.111
WUI near me is small communities	.438	1.153	.044	.380	1	.706
WUI near me is large urban/suburban	.015	1.193	.002	.013	1	.990
<b>Opinions</b>						
People doing more mitigation	.242	.640	.050	.378	4	.707
Climate change → risk	.888	.595	.230	1.494	4	.142
Normal cycles of drought	-1.13	1.043	-.153	-1.087	3	.283
Risk worse near me in WUI	.314	.702	.067	.447	3	.657
Fire agencies overburdened	.145	.682	.031	.213	3	.833
More people in WUI → risk	.950	.590	.220	1.610	4	.114
Fire is healthy	-.903	1.122	-.099	-.805	2	.425
Risk assess of all properties best	.437	.631	.092	.692	3	.492
<b>Demographics</b>						
Fire jurisdiction	.461	.382	.174	1.206	6	.234
Volunteer fire agency	-.955	2.042	-.064	-.467	1	.642
Years worked in wildfire	.654	.331	.213	1.975	5	.054
Age	-1.66	.980	-.205	-1.70	3	.096
Political affiliation (reference: democrat)	.121	.280	.053	.430	5	.669

Adj R<sup>2</sup> = .329



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Adjusted R<sup>2</sup> = .322



# Constraints to Informal Governance

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- Resources – financial and human

“When it comes right down to it, it takes a lot of sitting down at somebody’s house and looking at their house and their property and talking about what changes to make... **That’s what actually gets major amounts of work done.**” (WC)

“They do a great job, but in our local State Forest Service office there are five or six employees... **Six people, they’re not going to be able to go door-to-door in subdivisions** by themselves.” (WC)

# Constraints to Informal Governance

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- Anti-government attitudes

“There’s definitely a whole lot of landowners who... somebody comes to the door and they say, ‘Hi, I’m here from the government and I’m here to help.’ **And they don’t necessarily believe that.**” (WC)

“There were the people who **did not want anything that even had the whiff of government around them.**” (HP)

# Constraints to Informal Governance

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- Lots of people never get a close call, or find false comfort in a close call

"But, I'll tell you, **it only took one fire and then we started**. We started cutting the trees down around the deck, raking up the pine needles..." (HP)

"The people that didn't mitigate say, 'Holy cow, it's happened. **We're safe now**. We've got this great buffer around us now, so... no big problem.' That's an issue." (WC)

# Constraints to Informal Governance

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- Window of opportunity, evolving motivations

"You usually **have a window after a catastrophe where people are more willing to listen to you...** Less than a year." (HP)

"We have a year boost after a fire to get people out there doing treatments **based on fear**. And then we have to transition the message to, 'Yeah this is going to help protect you in a wildfire, but there are **all kinds of other good reasons to do this work.**'" (WC)

# Efforts to Overcome These Constraints

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- Collaboration with “citizen entrepreneurs”
  - But only 38% of our survey respondents report using citizen-to-citizen networks “often.”
  - Knock on doors, write CWPPs, apply for grants, link up with watershed groups and other NGOs.

“You need... **some real sparkplugs. Sometimes it really is just one or two people who are willing to take that and carry it forward** for a community on a private basis. And if you lose those people, you’ll lose the program.” (WC)

“The Colorado Springs Fire Department, they have a really small staff in their wildfire organization, **so their target is the HOAs. Then, of course, their neighborhood champions.**” (WC)

# Efforts to Overcome These Constraints

---

- Collaboration with NGOs (e.g., watershed groups)

Planning: “We are a **planning and coordination hub.**” (HP)

Human-power: “Six people, they’re not going to be able to go door to door in subdivisions by themselves... **we’re essentially helping to provide additional staff to those state and federal partners.**” (WC)

Funding: “The state forest service will put in a grant with a subdivision, but it’s a 50% match... **we can cobble together a variety of grant funds** and work with a group of landowners to get bigger projects done.” (WC)

# Conclusions

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- The most successful approaches to this collective action problem are currently **outreach/education-based** rather than regulatory.
  - **Successes are based on fostering personal connections** – linking people to resources and each other, encouraging local planning, appealing to evolving values.
  - **Successes are collaborative.** “Citizen entrepreneurs” and NGOs (e.g., watershed groups) have important roles to play in extending/amplifying agency efforts.
  - **There is room for more collaboration.** Citizen entrepreneurs and NGO partnerships could be utilized more often and more extensively.

# Future Wildfire Work

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- Learning more from practitioners about multi-jurisdictional collaborative efforts and the role of watershed groups in wildfire risk mitigation
- Further survey analysis and modeling
  - Resource managers' perceptions of the causes of wildfire and the characteristics of their WUI
  - Resource managers' attitudes toward responsibility for mitigation
  - Connections between these perceptions/attitudes and agency approaches to mitigation

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# Q&A

**Thank you!**

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[Elizabeth.Koebele@Colorado.edu](mailto:Elizabeth.Koebele@Colorado.edu)

# Conclusions

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- Progress is incremental.
- “We have subdivisions that we’ve been working in for probably ten years now. Because **it’s like eating an elephant**. You’ve got to keep eating a little bit every day. You’re not going to get it all down quickly.”
- “One guy can do a little or **a whole neighborhood can change the odds**, so we’re out to change the odds.”

# For Avon... Going into Watershed stuff further

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- [[Not only talking about defensible space here. Watershed groups can be key in tying efforts of fire managers on private land to the “bigger picture” of fire mitigation that individuals simply couldn’t take on alone (i.e. large scale mitigation that changes fire behavior rather than simply protecting property/citizens).
- Watershed groups don’t necessarily “scale up” local mitigation; they pair it with other landscape-scale activities in a way that can not typically be done by fire managers or citizens alone for the reasons stated above. These large-scale landscape changes affect fire behavior and watershed health much more than increased defensible space around homes.]]