



## Best Practices in Public Communication on a Wildfire:

**WILDLAND FIRE CANADA, HALIFAX, NOVA SCOTIA Oct 7-9, 2014**

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# Community Resilience and Disasters

- Climate Change = more intensive disasters
- Wildfire as a microcosm
  - How do we think about a community's capacity to respond to a disaster?
  - How can we prepare and respond more effectively?
  - Communication and coordination as key activities
  - Community as a unit of analysis

# Acknowledgements

- Branda Nowell, Partner in Crime, Co-PI
- Sarah McCaffrey, Co-author
- Fire Chasers Project @North Carolina State University
  - Advancing the science of adaptive capacity toward more disaster resilient communities
  - <http://firechasers.ncsu.edu>



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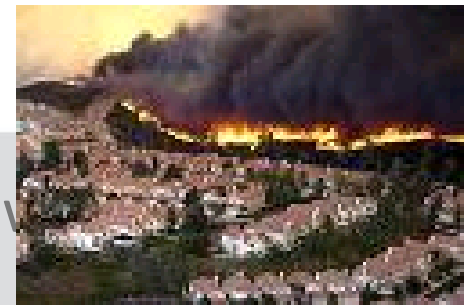
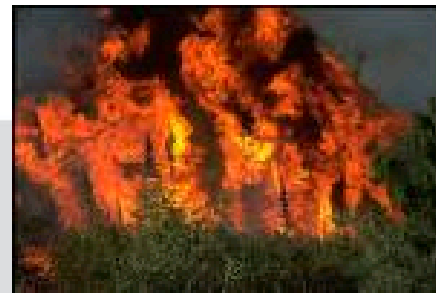
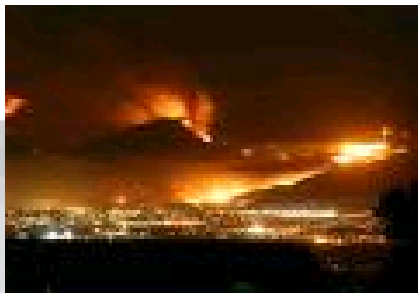
# Preparedness and Response

# Addressing the Mitigation Paradox at the Community Level

Steelman, Toddi A. 2007. "Addressing the mitigation paradox at the community level", In *Wildfire Risk: Human Perceptions and Management Implications* (eds W. Martin, C. Raish & B. Kent), pp. 64-80. Resources for the Future, Washington, DC

# Wildfire Mitigation Paradox

- **More people, property and infrastructure at risk**
  - Public forestlands characterized by declining forest health and increased propensity for uncharacteristic wildfire
  - Growth of human communities living in the wildland urban interface (WUI)
- **But risks of individuals taking mitigation action often do not outweigh perceived benefits**
  - Homeowners bear costs, exert effort, sacrifice aesthetic benefits
  - Uncertain increases in protection for low probability event



# Empirical Evidence

- The conventional framing of mitigation action along risk-benefit lines leads to **bias against action**
  - Urban residents have **low awareness** of fire severity/occurrence (Gardner et al. 1987)
  - Households prone to natural hazard risk consistently **under invest** (White 1974, Kunreuther 1978; Fishchoff 1989; Winter and Fried 2000).
  - Homeowners **reject** safety ordinances, identify education/zoning as **unworkable**, **reject** Rx fire (Winter and Fried 1997; 2000)
  - Defensible space ordinances **fail** to generate risk reduction (NFPA 1992).



# And yet.....

- Flagstaff AZ
- Ruidoso NM
- How do communities address the mitigation paradox?



# Predisposition for Action

- Three factors inform risk valuation and management
  - **Institutional arrangements (incentive programs)**
    - H: improve institutional incentives; ↑ mitigation
    - Appropriately structured institutional arrangements
  - **Imperfectly informed consumers (outreach/education)**
    - H: ↑ information; ↑ mitigation
    - Informational efforts
  - **Public vs. private risk exposure (inter-jurisdictional)**
    - H: ↑ collective action; ↑ mitigation
    - Develop shared sense of responsibility

# Conclusions

- If perceived risks are low and benefits of risk reduction costly, then action not likely
- BUT
  - **Raise risk awareness**
    - Information Efforts
    - Shared Responsibility
  - **Reduce costs**
    - Institutional arrangements
    - Shared responsibility
- THEN risk-benefit calculus shifts

# Best Practices in Risk and Crisis Communication: Implications for Wildfire Management

Steelman, Toddi, and Sarah McCaffrey.

2013. "Best Practices in Risk and Crisis Communication:  
Implications for Natural Hazards Management",  
Natural Hazards, 65(1), 683-705

# Wildfire Context

- Suppression as primary focus
- Need to diversify fire management strategies
- More flexible fire management
  - Promotes more ecologically sound resource management
  - Fosters lower future fire hazard levels
  - Reduce losses and risks
  - Lead to more efficient use of resources during a wildfire

# Challenge

- Fire management expectations are situated in a broader social context.
- Public may expect a more suppression oriented only response.
- How do we effectively communicate?
  
- Hypothesis: Effective communication before and during the fire will be associated with more flexible fire management strategies

# Common Characteristics

	Risk Comm	Crisis Comm	Before Wildfire	During Wildfire
<b>Interactive processes or dialogue</b>	Witte1995; NRC1996;Chess 2001; Heath et al. 2002; Palenchar and Heath 2002; Sellnow et al. 2009	Seeger 2006; Heath et al. 2009	Parkinson et al. 2003; Toman et al. 2006; Shindler et al. 2009; Eriksen and Prior 2011; McCaffrey and Olsen 2012	Sharp et al. 2009
<b>Understand the social context</b>	Beck 1992; Heath et al. 2009; Sellnow et al. 2009; Bier 2000; Palenchar and Heath 2002	Seeger 2006	Winter et al. 2002; Zaksek and Arvai 2004; Gregory 2000; Arvai et al. 2001; Vaske et al. 2007; Martin et al. 2009; Paveglio et al. 2009; Lachapelle and McCool 2012; McCaffrey and Olsen 2012	Cohn et al. 2006; Taylor et al. 2007; Sutton et al. 2008
<b>Honest, timely, accurate, reliable info</b>	Sellnow et al. 2009	Seeger 2006; Seeger et al. 2003;	Paveglio et al. 2009; Shindler et al. 2009; Lachapelle and McCool 2012; McCaffrey and Olsen 2012	Kumagai et al. 2004; Taylor et al. 2007; Sharp et al. 2009
<b>Work with credible sources</b>	Palenchar and Heath 2002; Sellnow et al. 2009; Fessenden-Raden et al. 1987; Earle et al. 2007	Seeger 2006; Seeger et al. 2003	Paveglio et al. 2009; McCaffrey and Olsen 2012; Olsen and Shindler 2010	Kumagai et al. 2004
<b>Communicate before and during crisis</b>	Seeger 2006; Heath et al. 2009; Sellnow et al. 2009		Kumagai et al. 2004; Olsen and Shindler 2010; McCaffrey et al. 2012	

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# Three Wildfires in 2008

- Gap
  - Los Padres National Forest, California
  - Full Suppression
- Cascade
  - Custer National Forest, Montana
  - Modified Suppression (perimeter control on one side, other side monitored)
- Gunbarrel
  - Shoshone National Forest, Wyoming
  - Wildfire Use/Resource Benefit

# Findings

- Gap

- Fewest number of effective communication characteristics
- Higher level of public dissatisfaction with fire management
- Suppression response– assumed to be least likely to cause dissatisfaction

- Gunnbarrel

- Met all effective communication characteristics
- Little evidence of dissatisfaction
- Most flexible fire management strategy

# Implications

- **HYPOTHESIS:** Effective communication before and during the fire is associated with acceptance of more flexible fire management during the fire
- Effective communication *does not lead directly* to acceptance – relationship between effective communication and positive results
- Effective communication before and during the event *are not determinative* of fire management strategy, but may create opportunities for more flexible strategies to be utilized
- The desire to use a strategy that is *less conventional* may lead to greater effort to communicate ahead of the event

# Communication Under Fire: Factors that shape network structure and communication efficacy in large wildfires

Branda Nowell and Toddi Steelman,

Nowell, B. and T. Steelman. 2014. Communication under Fire: Emergence, Embeddedness and Performance in Disaster Response Networks. *Journal of Public Administration Theory and Planning*. Published online July 1, 2014. doi: 10.1093/jopart/muu021

# Research Question

- Do people who know each other or are similar to each other perform better on a large wildfire?
  - Conventional and scholarly wisdom say yes, but not tested
    - Kapucu, 2006; Drabek and McIntire 2002; 2003; Gillespie and Streeter, 1987
  - We empirically test this proposition
  - Use data from actual wildfires, during the incidents
    - New Mexico, Arizona, California 2010

# Findings

- Increasing familiarity before the incident can increase communication effectiveness during the incident.
- There may be increased risk during the disaster when responders come from similar stakeholder groups or similar functional groups and are not familiar with each other.

# Preparedness: LESSONS LEARNED

- Strategic action before a fire can help overcome the mitigation paradox
  - Institutional arrangements-- incentives
  - Shared responsibility-- education
  - Information about your public/private neighbors
- Effective communication before and during the fire is associated with more flexible fire management strategies
- Familiarity before the wildfire is associated with better performance during the wildfire

# Response



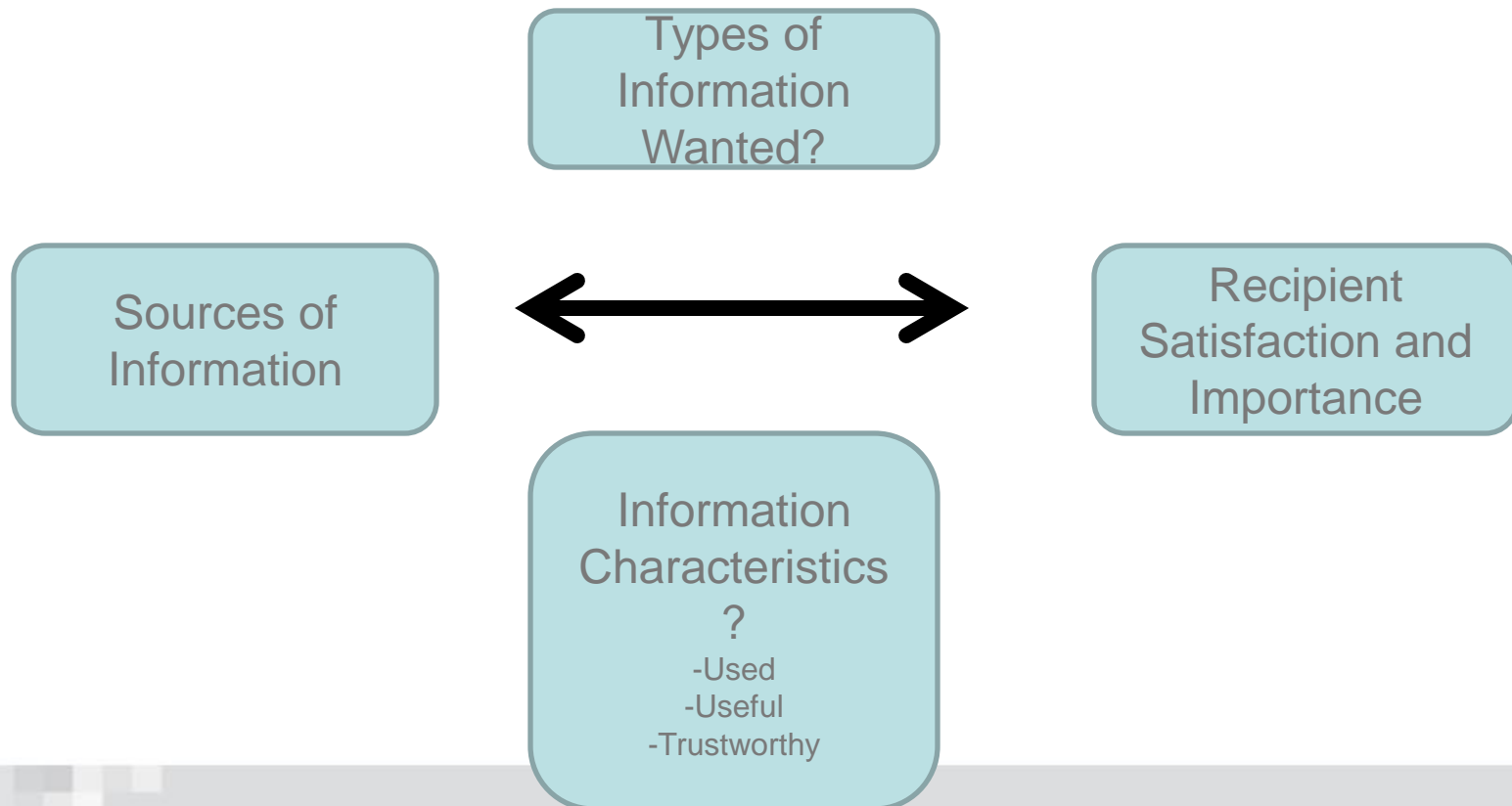
# What Information Do People Use, Trust, and Find Useful During a Disaster? Evidence from Five Large Wildfires

Toddi Steelman, Ph.D, Anne-Lise  
Knox Velez, Jason Briefel,  
Sarah McCaffrey, Ph.D.  
Under review, Natural Hazards

# Information during a disaster

- Need information so a disaster can be effectively managed
  - Communication as a system of relationships (Fessenden-Raden, 1987; Renn, 1991)
    - Sources
    - Transmitters
    - Receivers
- Lack of empirical evidence
  - What is the information seeking behavior of recipients (the public)?
    - Used
    - Useful
    - Trusted

# Communication system



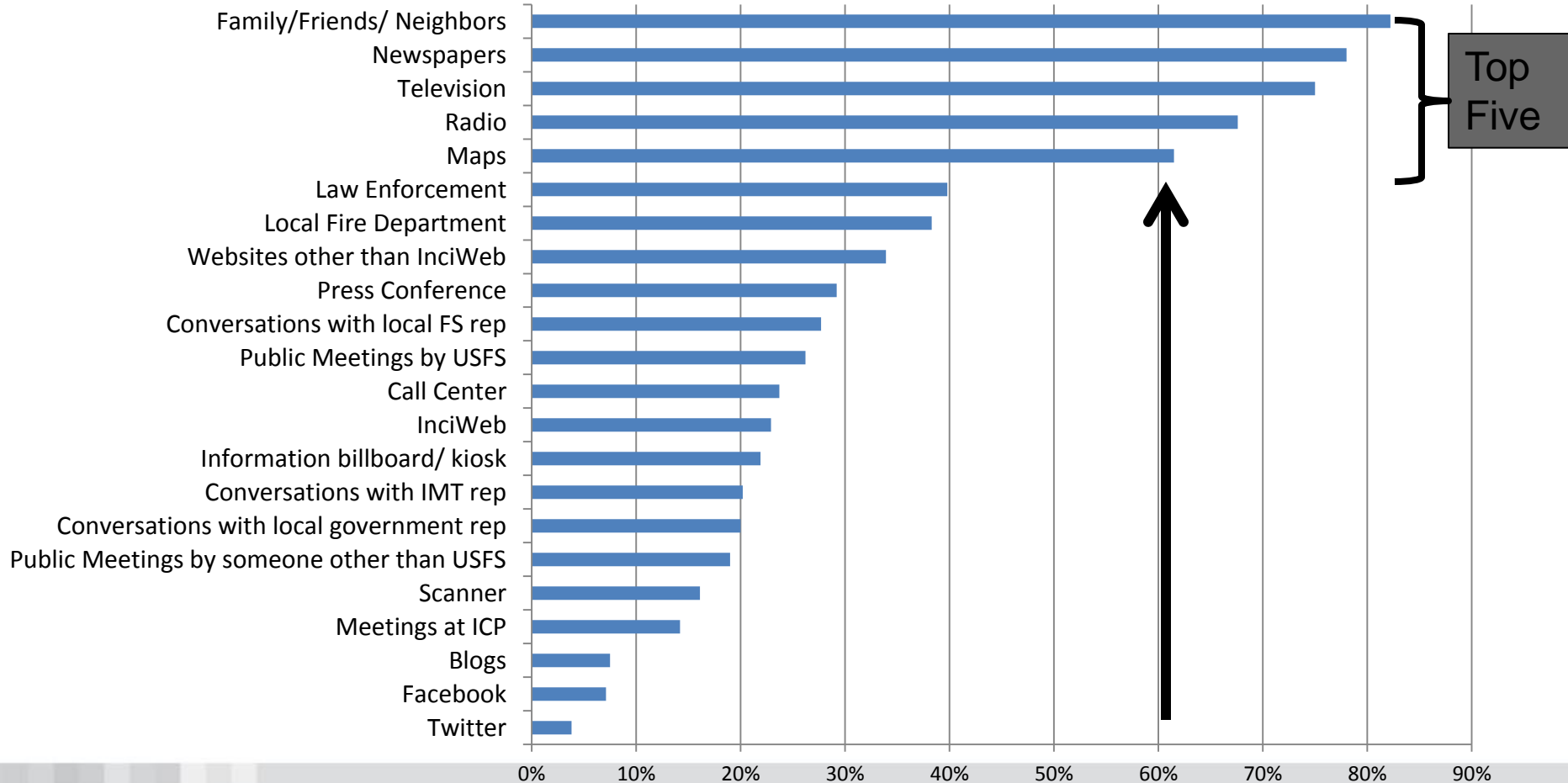
# Methodology

- 1 fire during 2009 fire season:
  - Hat Creek
- 4 fires during 2010 fire season:
  - Tecolote Fire, NM; Schultz Fire, AZ; Bull Fire, CA; Fourmile Canyon Fire, CO
- Mail survey (3-wave based on Dillman's methods)
  - N= 873 (sent to 5,700+), response rate 13%
  - 2009
  - 2010



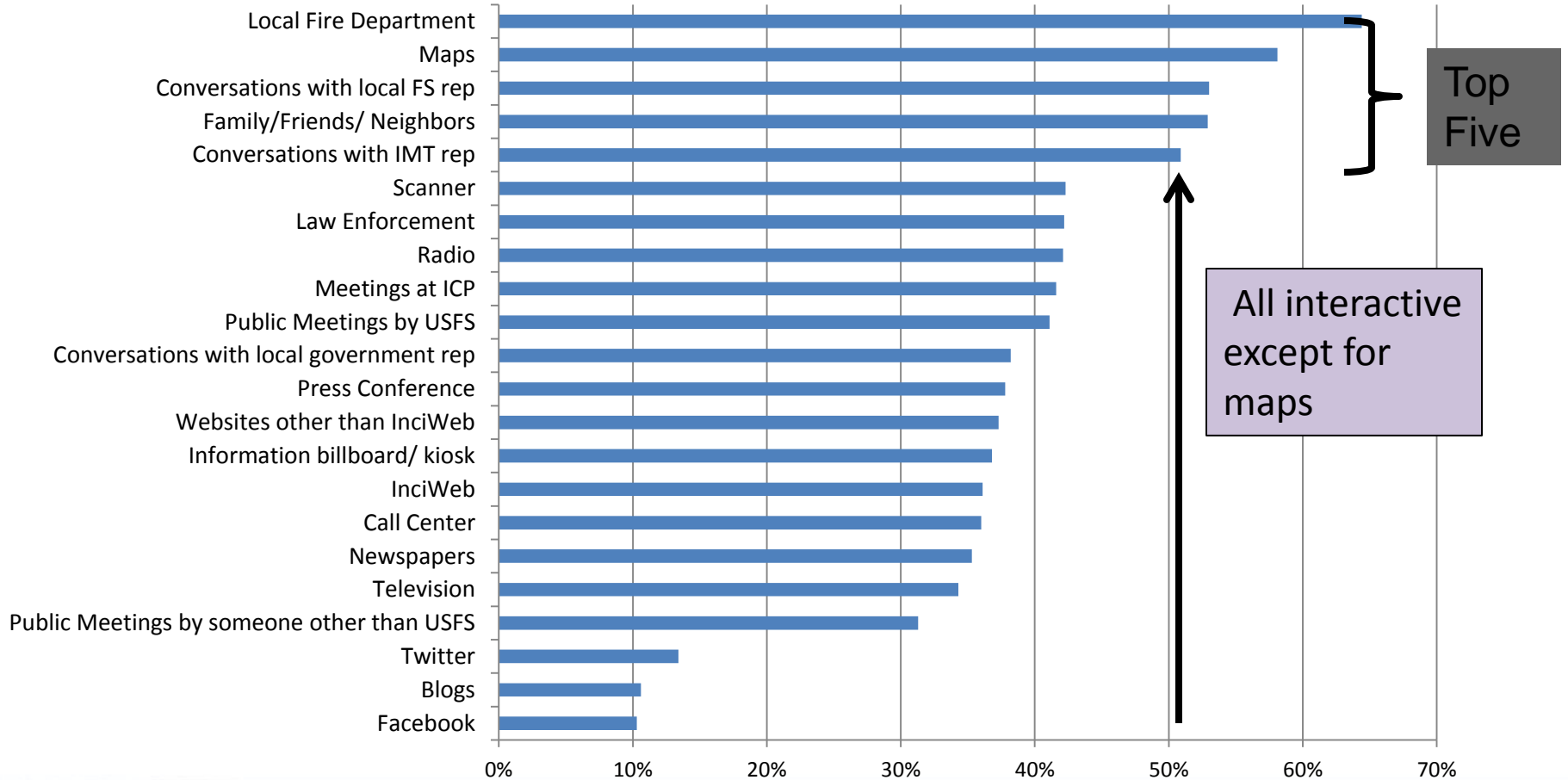
# Information Used on 5 Large Wildfires

(Steelman, Valez, Briefel and McCaffrey, under review)



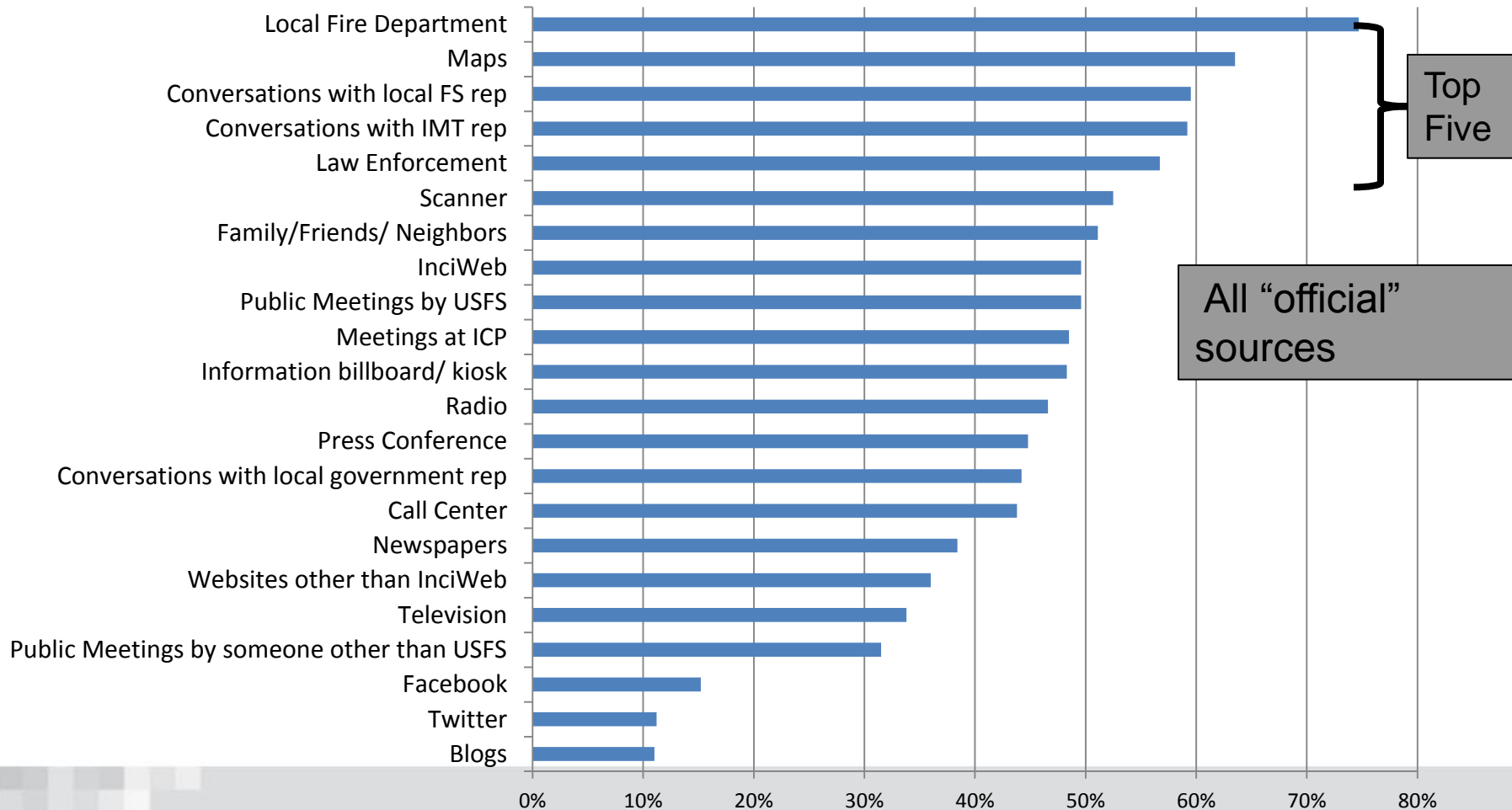
# “Very Useful” Information

(Steelman, Briefel, Valez and McCaffrey, under review)

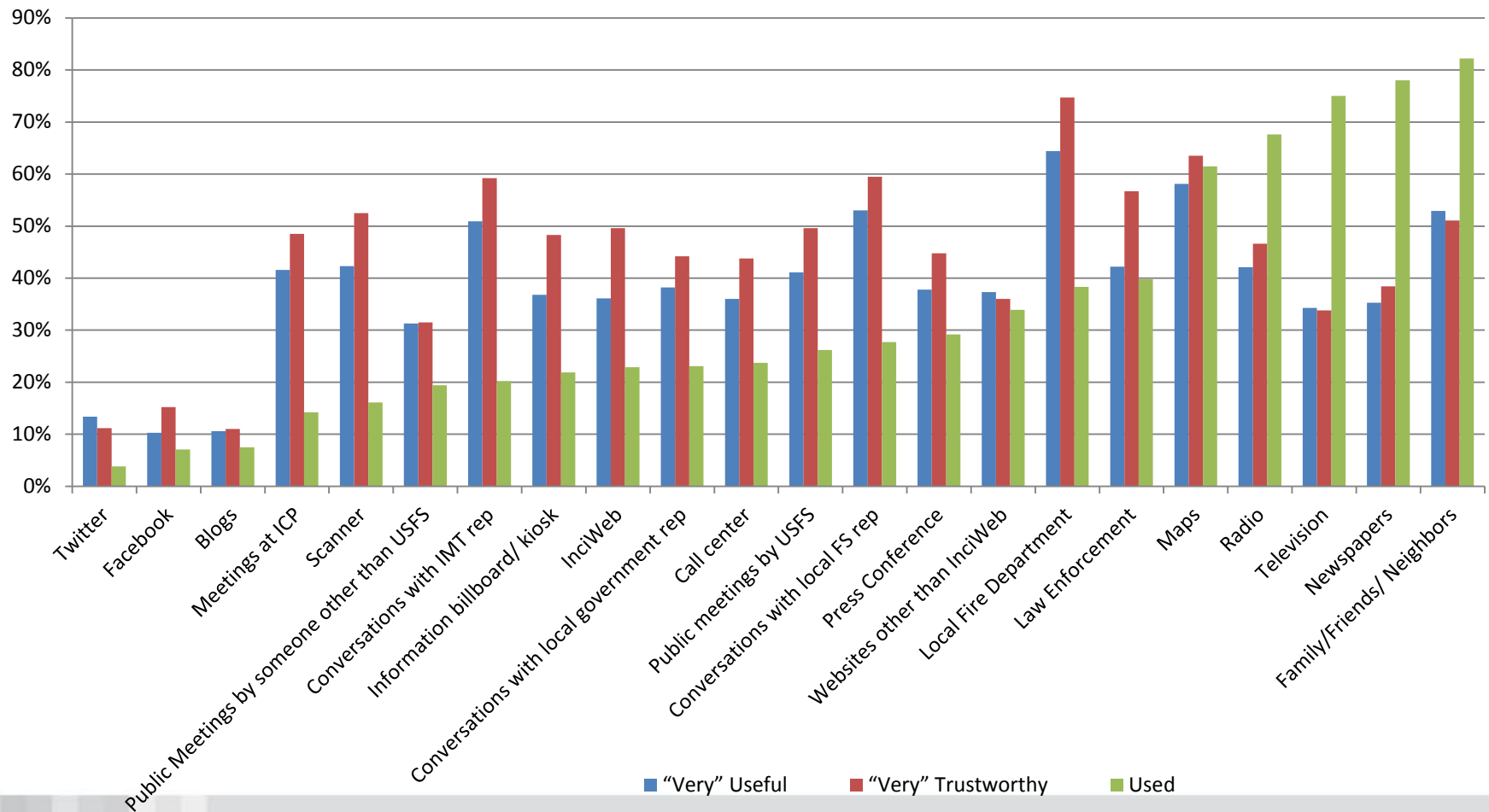


# Very Trustworthy

(Steelman, Briefel, Valez and McCaffrey, under review)

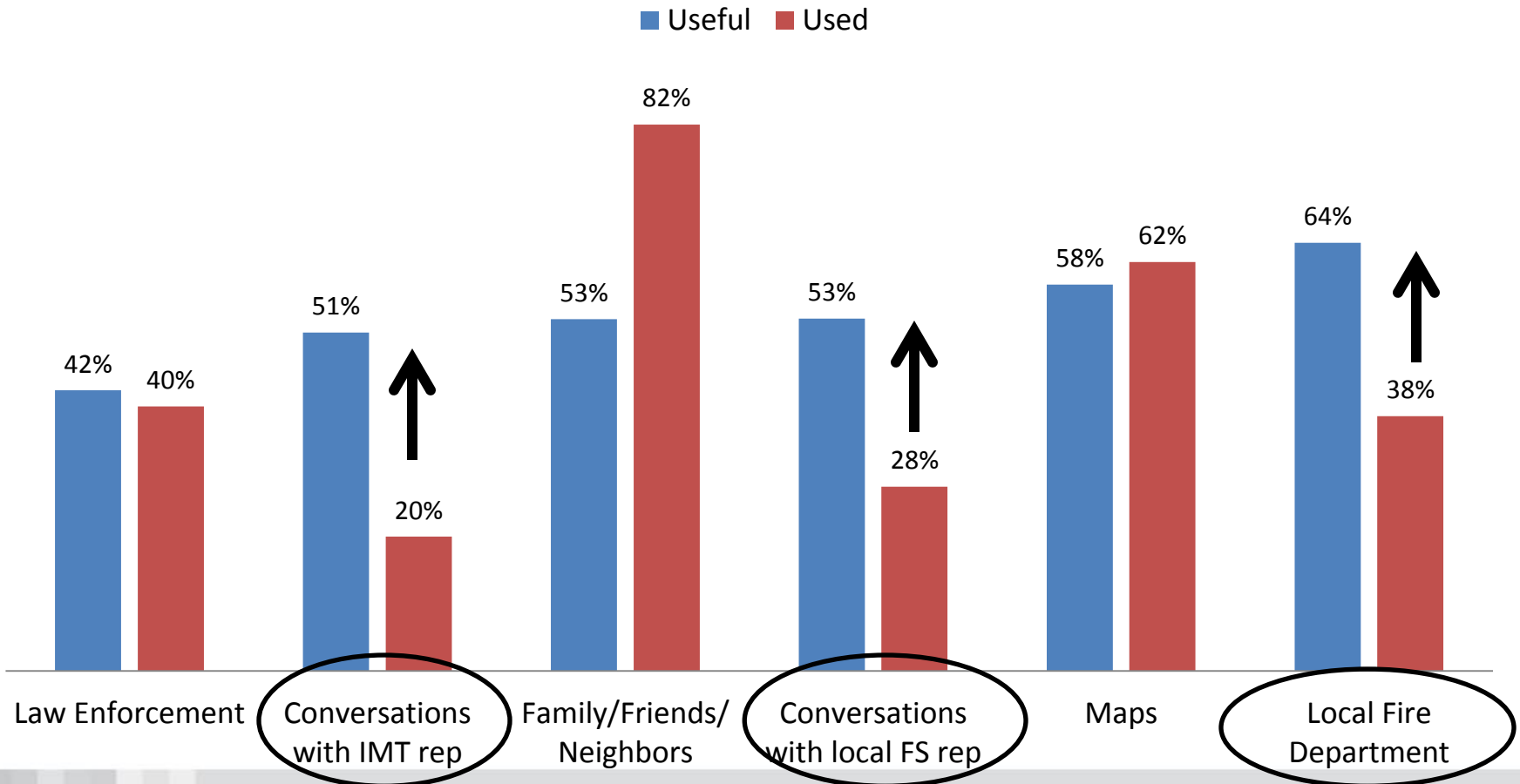


# Useful, Trustworthy, Used – All Fires



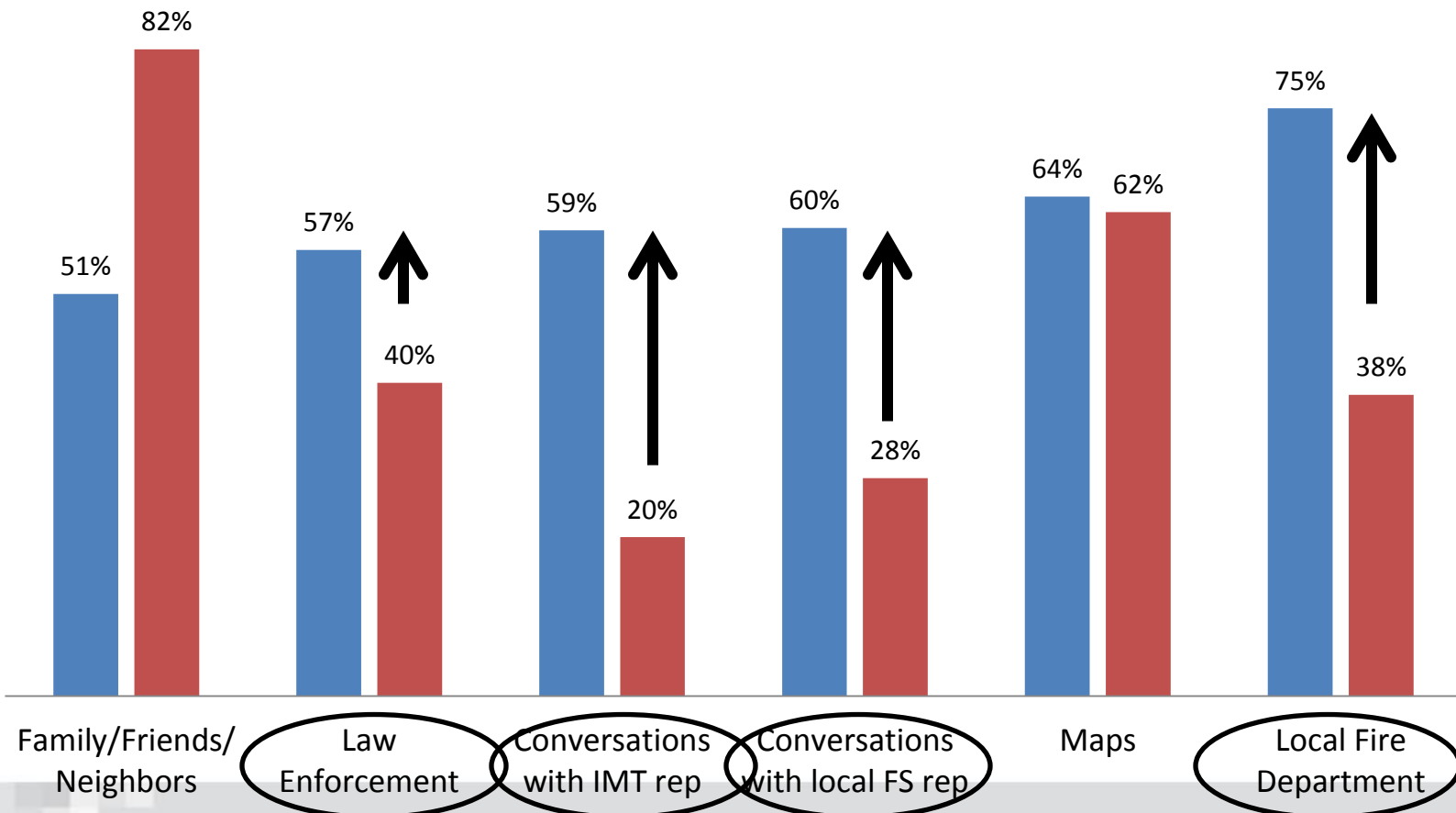


# Used and Useful – All Fires



# Trustworthy and Used – All Fires

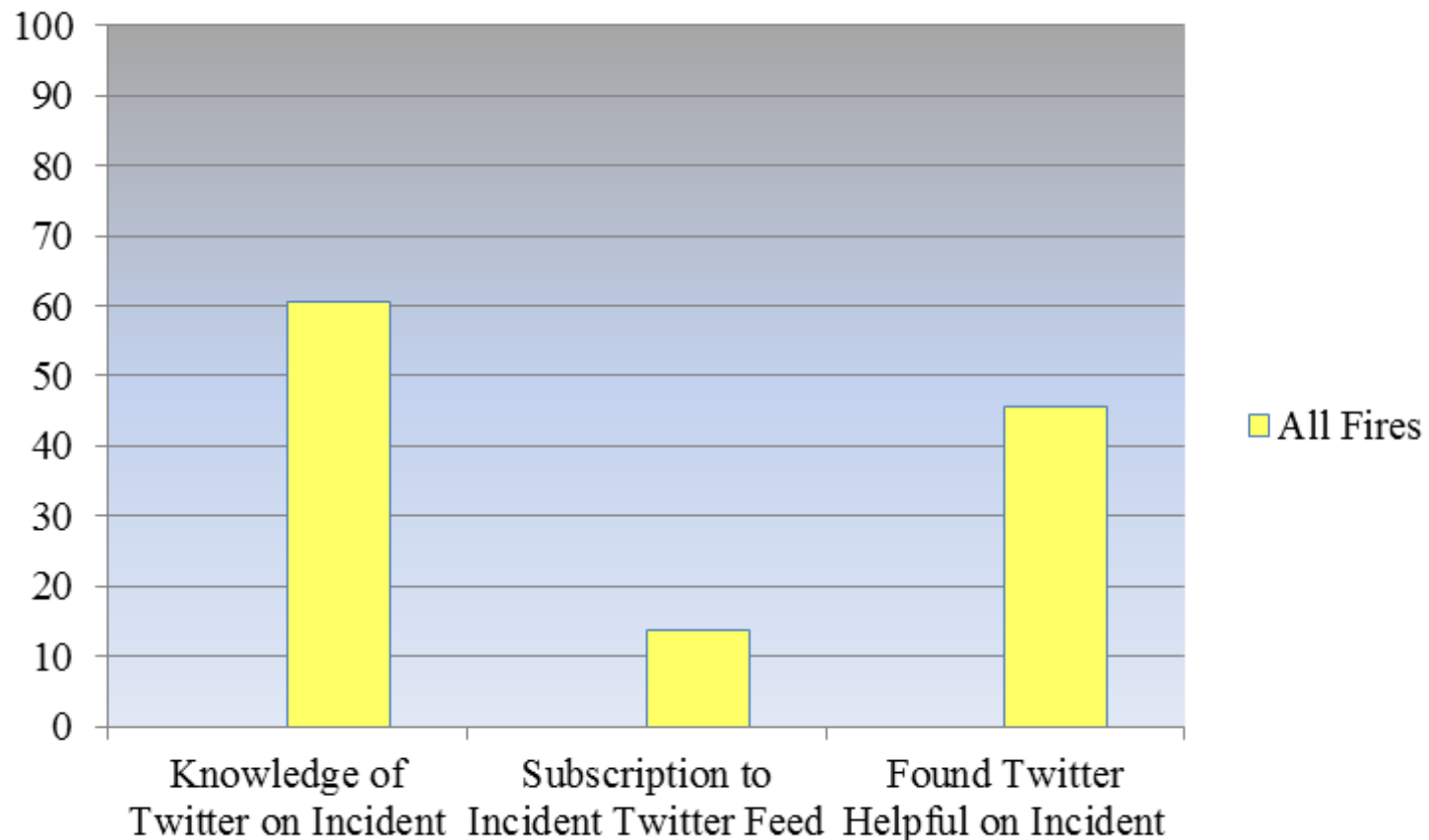
■ Trustworthy ■ Used



# Implications

- Sources most used– family/friends/neighbors, mass media & maps
  - Readily available
  - **Convenience:** people go to what they are most familiar
- Most useful sources– **interactive**
  - Makes them difficult to use widely
  - Can the interactive format be leveraged using platforms to enhance greater use?
- Most trustworthy sources– **official**
  - Some interactive (conversations)– makes them difficult to use widely
  - Others could be made more available through mass media (transmitter)
- Sources least used, useful, or trustworthy– **social media**
  - Not penetrating in 2009, 2010
  - Use will probably increase over time
  - Usefulness, trustworthiness ??

# Use of Twitter on 22 wildfires 2013



# Response: LESSONS LEARNED

- Convenience → people go to information during the incident with which they are most familiar
- Interactive and official sources are most useful and trusted
- Social media needs more research

## • Disaster preparedness and response

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*Managing Fire, Understanding Ourselves:  
Human Dimensions in Safety and Wildland Fire*

# CALL FOR PRESENTATIONS

*13th International Wildland Fire Safety Summit and  
4th Human Dimensions of Wildland Fire Conference*

*April 20-24, 2015, Boise, Idaho, USA*



International Association  
of Wildland Fire

QUESTIONS? Toddi Steelman, [toddi.steelman@usask.ca](mailto:toddi.steelman@usask.ca)

Exhibit and Vendor opportunities available  
The deadline for submissions is December 1, 2014.  
<https://iawf.submittable.com/submit/34643>