



# FIRE MANAGEMENT AND RISK PERCEPTION THROUGH AN ORGANIZATIONAL LENS

*WORKSHOP ON FIRE WEATHER AND FORECASTING*

*13-15 FEBRUARY 2024*

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# The Problem...



- Observed increases in wildfire frequency, the number of large fires, and fire season length in many portions of the U.S.
- Expect to see an increase in fire activity with further warming and reductions in precipitation (NCA5).
- Impacts to the economy, ecology, agriculture, health and safety, and cultural traditions.
  - Human fatalities and property loss;
  - Resource demand for disaster prevention and recovery;
  - Dangerous air quality
- Exacerbating this threat further is development and related population increase at the wildland-urban interface (WUI).



## What is the goal?

- ▶ Reduce and manage wildfire risk!
- ▶ Federal, state, and local fire management agencies are at the front-line of combating this increasing threat of wildfires
- ▶ Agencies must plan, adapt, and respond
  - ❖ **To do that most effectively and efficiently, we need a better understanding of fire management, risk perception, and decision-making at these various management/organizational levels**

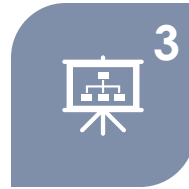
# Research Questions



How do organizations at different levels (federal, state, & local) **perceive wildfire risk?**



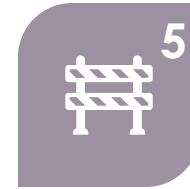
How do fire managers associate **wildfire risk with climate change and/or human behavior?**



What **products & information** do organizations use for their decision-making processes?



What factors & **pressures** drive organizational **decisions & perceptions?**



What are the **challenges** to the success of organizations?



# Methods

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## ONLINE SURVEYS

- Federal, regional, and state fire managers
- 47 questions
- 264 survey responses

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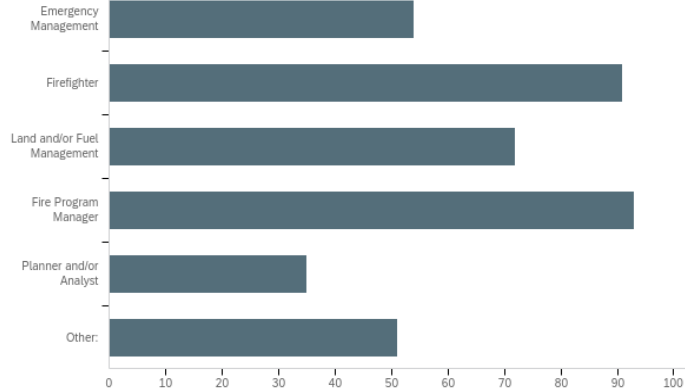
## FOCUS GROUPS

- Local fire managers within Oklahoma
- 5 regional focus groups
- 20 participants





How would you best describe your role in fire management? Check all that apply.



12.) Are there any risks not mentioned above that you are worried about? Please describe.

wildland urban interface

wear and tear on firefighting forces. Whether a local VFD or fed/state resources, most were developed for a fairly finite season in their geographic area, and in many cases those seasons have extended by weeks or months, and resources are responsible for managing far more complex incidents than they have been historically accustomed to, and developed for.

urban / rural interface

the above are all inter-related and largely on equal footing

staffing issues - having enough wildland fire personnel...a dwindling resource.

smoke in distance communities

shortages in staffing. employee work rest ratio. unequal pay between agencies and

| CODE | THEME               |
|------|---------------------|
| 1    | WUI                 |
| 2    | Staffing            |
| 3    | Smoke               |
| 4    | Money               |
| 5    | Property Management |



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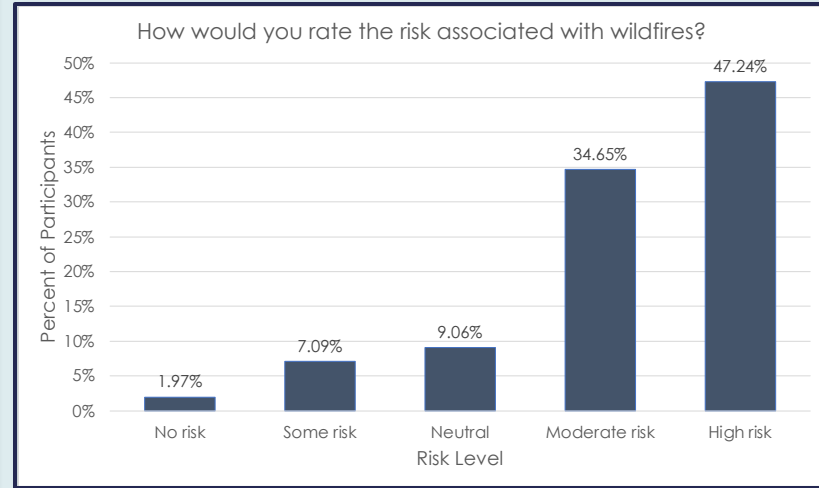
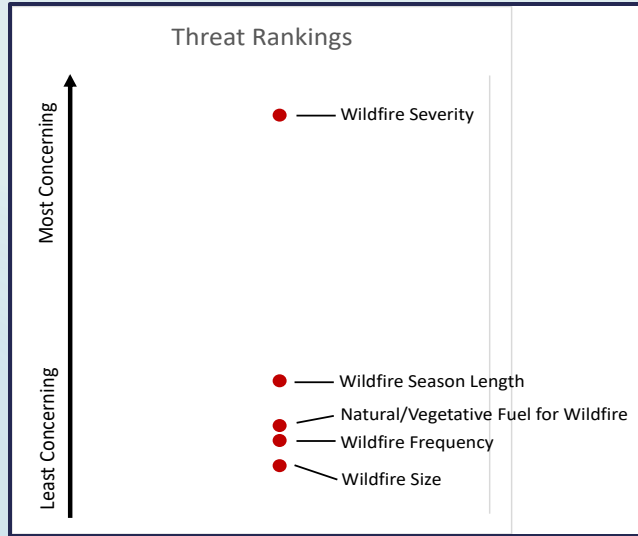
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# Results

## Federal and State



How do organizations at different levels (federal, state, & local) **perceive wildfire risk?**



# Local (Oklahoma) Fire Managers

- Majority said wildfire risk is increasing (fire trends/characteristics)
- Increased risk because of human-environment interactions
- More concern about WUI, increased exposure, lack of fuel and land management, and land fragmentation



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How do organizations at different levels (federal, state, & local) **perceive wildfire risk?**

“Easier to fight fire on 40,000 acres than 40.”

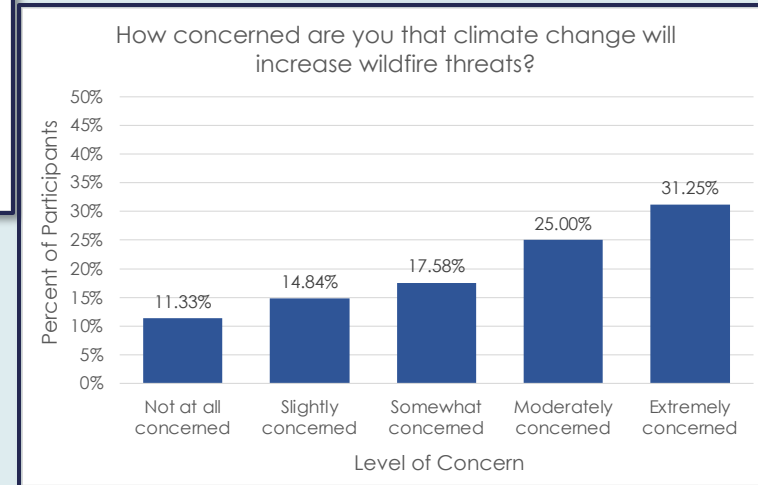
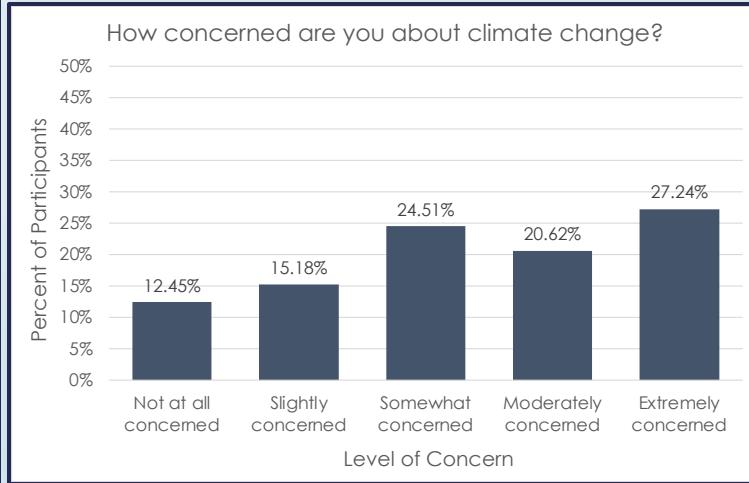
“Your **weekend warriors** that like to go out and hunt. They'll have a little hunting cabin. You're seeing these in there. When they're buying up these 40-acre patches, they don't want cattle on there. They want it to be natural.”



# Federal and State



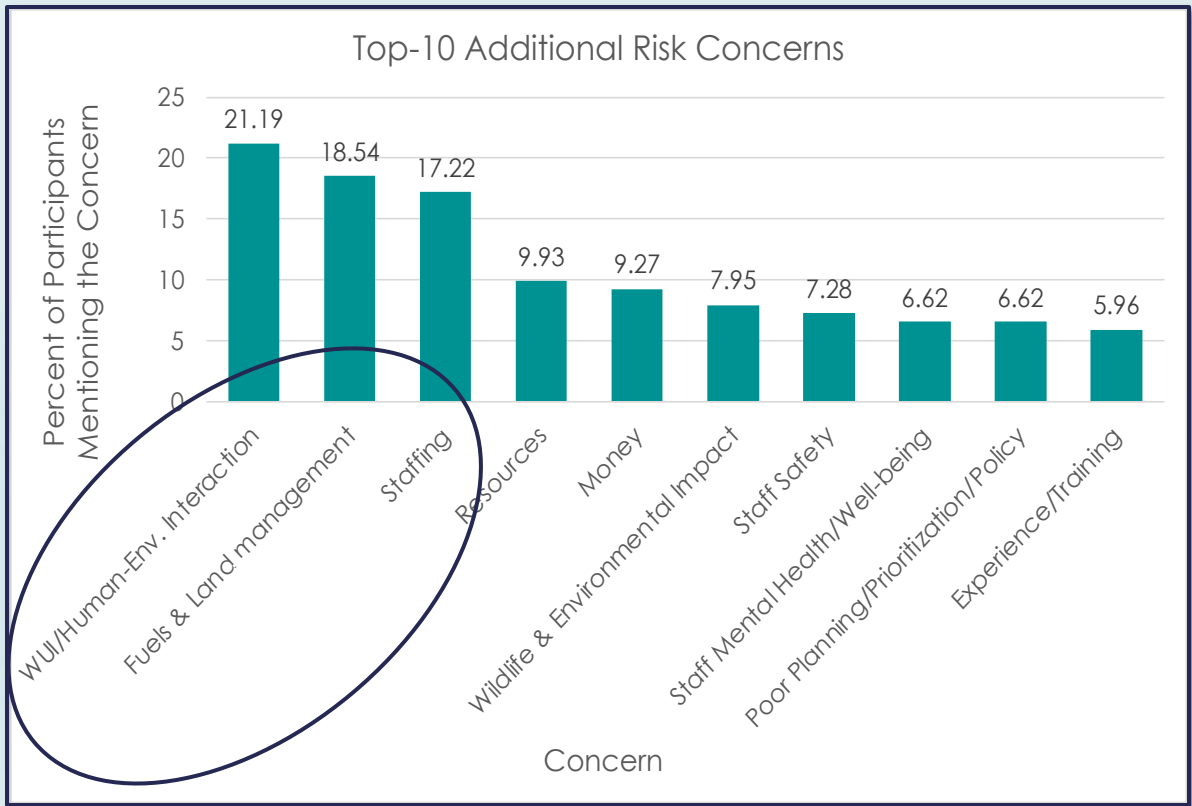
How do fire managers associate wildfire risk with climate change and/or human behavior?



# Federal and State



How do fire managers associate **wildfire risk with climate change and/or human behavior?**



# Local Fire Managers



How do fire managers associate wildfire risk with climate change and/or human behavior?

- Observed “a change” or extreme weather (drought, flood, heat), but do not necessarily attribute it to or call it climate change.
- **10%** think climate change exists and is related to wildfire
- **20%** do not think climate change exists nor is related to wildfire risk
- **70%** did not know, said there isn't enough evidence, or didn't refer to it as climate change
- ❖ Risk due to humans, fuels, and land management

“Hard to say. We haven't been around long enough to know.”

“There's a change, whatever you want to call it, there is a change in the traditional patterns.”

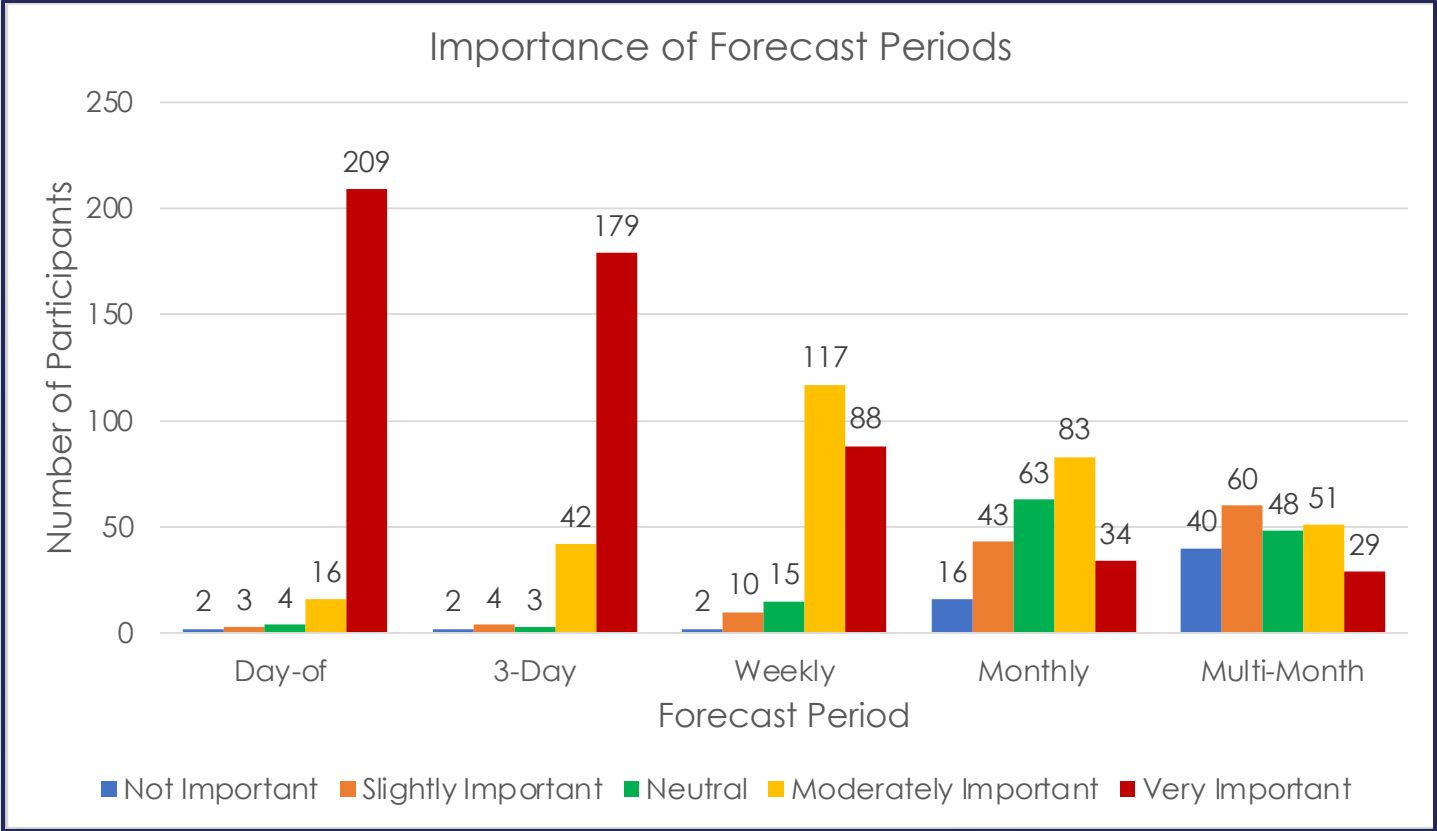
“As population increases, the risk goes up. It's just that simple. I'm not ready to buy into the global warming is causing all the trouble deal yet, but I'm not saying it's not having an effect.”

“I don't see our climate being drastically different than it was in 1935.”

# Federal and State



What **products & information** do organizations use for their decision-making processes?



# Federal and State

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What **products & information** do organizations use for their decision-making processes?

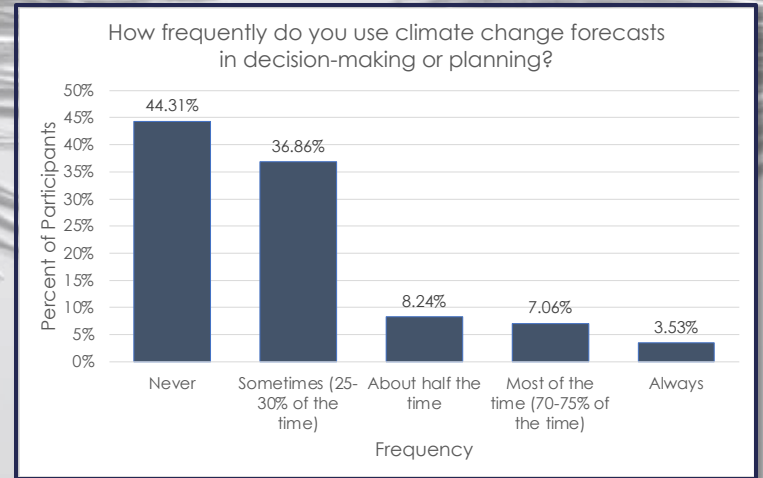
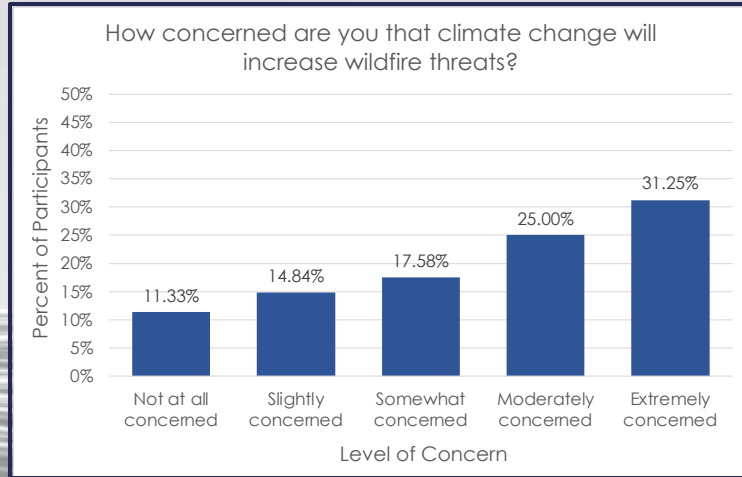
| Tool or Data Type   | Percent of Participants |
|---|-------------------------|
| <b>National Weather Service Outlooks/Forecasts</b>                  | <b>55.98</b>            |
| <b>Mesonets</b>   | <b>41.85</b>            |
| <b>State/Regional/University/Private Decision Support Platforms</b> | <b>38.59</b>            |
| <b>Federal Planning and Management Tools and Websites</b>           | <b>32.61</b>            |
| Private Forecasts Websites  | 15.22                   |
| Fire Weather/Behavior Indices                                       | 13.59                   |
| Weather Station Observations  | 13.04                   |
| National Interagency Fire Center                                    | 11.41                   |
| GIS/Mapping Tools   | 11.41                   |
| Long-Term/Climate Indices or Forecasts                              | 9.78                    |
| Air Quality and Smoke Monitoring/Forecasts                          | 8.15                    |
| Info from Partners via Chat/Phone/Meeting                           | 8.15                    |
| Satellite   | 7.61                    |

## A disconnect...

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What **products & information** do organizations use for their decision-making processes?



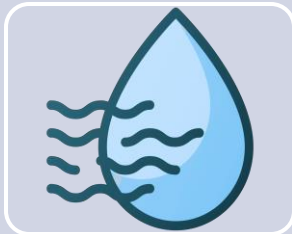


# Local Fire Managers' Ranked Products



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What **products & information** do organizations use for their decision-making processes?



## VARIABLES

1. Relative Humidity
2. Wind Speed & Direction
3. Temperature
4. Fuel Moisture



## PRODUCTS & INFO

1. NWS Forecasts and Outlooks
  - Briefings
  - Direct calls/emails
2. OK Mesonet
  - OK-FIRE
  - OK-First
3. Satellite
4. State Forestry
5. Smoke Dispersion
6. Media



## FORECAST PERIOD

1. Current-Hourly
2. 1-2 Days
3. Day-of
4. 1-2 weeks
5. 3-5 Days
6. Multi-Month

# Federal and State



What factors & pressures drive organizational decisions and perceptions?

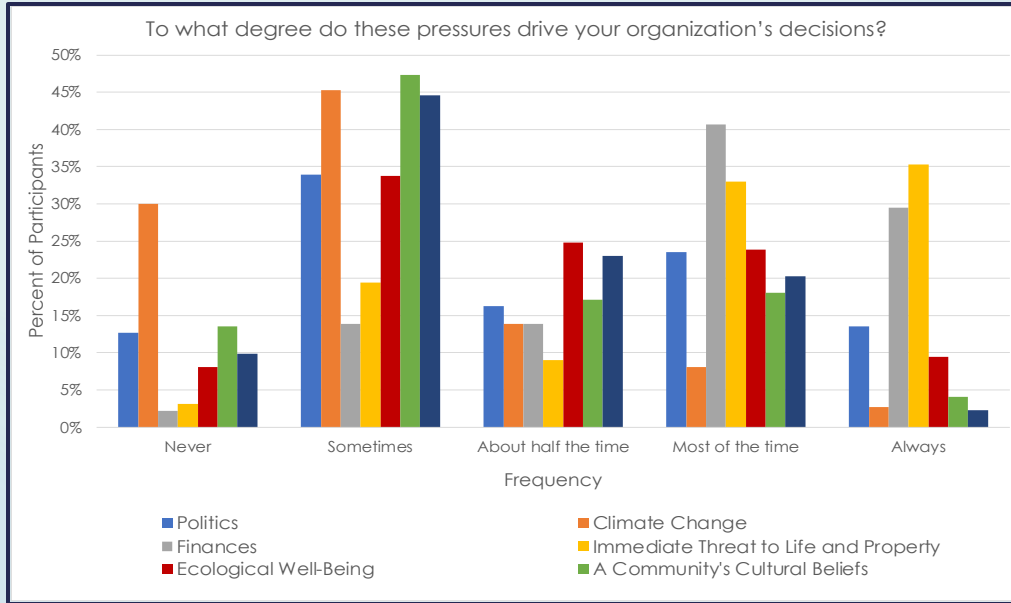
| How have past fire events changed your views on wildfires?          | % of Participants Mentioning Comment |
|---|--------------------------------------|
| <b>Recognized the severity and increased risk</b>                   | <b>40.19%</b>                        |
| <b>Recognized significance and role of fuel and land management</b> | <b>17.76</b>                         |
| <b>Changed planning, management, and/or operations</b>              | <b>17.29</b>                         |
| Improved fire understanding and experience                          | 10.75                                |
| No change   | 10.28                                |

| How have past fire events changed your approach to fire management?  | % of Participants Mentioning Comment |
|--|--------------------------------------|
| <b>Focus on planning and preparation</b>                             | <b>28.16</b>                         |
| <b>Focus and need for prescribed burning/fuel management</b>         | <b>22.33</b>                         |
| <b>Focus on safety and risk management</b>                           | <b>16.02</b>                         |
| How they operate real-time and respond                               | 12.14                                |
| Understand need for more resources and funding/trying to obtain more | 9.22                                 |
| Need for coordination/collaboration/teamwork                         | 9.22                                 |

# Federal and State Pressures



What factors & pressures drive organizational decisions and perceptions?



- RANKINGS**
- # 1 Finances
  - # 2 Immediate Threat to Life and Property
  - # 3 Politics
  - # 4 Ecological Well-Being
  - # 5 Social/Community Approval
  - # 6 Community's Cultural Beliefs
  - # 7 Climate Change

| Additional Pressures         | % of Participants Mentioning Comment |
|------------------------------|--------------------------------------|
| Politics                     | 12.30                                |
| Staffing                     | 10.66                                |
| Competing Agendas/Objectives | 8.20                                 |
| External/Public Influence    | 8.20                                 |
| Leadership                   | 7.38                                 |

# Local Fire Managers



What factors & **pressures** drive organizational **decisions and perceptions?**

| RANK | PRESSURE                                    |
|------|---|
| 1    | <b>Public pressure/influence</b>            |
| 2    | <b>Landowner pressure</b>                   |
| 3    | Competing internal strategies/objectives    |
| 3    | How funding is allocated/Competing projects |
| 3    | Staff and training                          |
| 4    | Politics                                    |
| 4    | Competing/negotiating agency roles          |
| 4    | Funding/maintaining budget                  |
| 4    | Balancing resources                         |
| 4    | Self-inflicted pressure to do a good job    |
| 4    | Economic pressure                           |

- Local fire managers felt strongly about the need for public education regarding prescribed burning and land management to address pressures.

# Federal and State

5



WHAT ARE THE  
**CHALLENGES** TO  
THE SUCCESS OF  
ORGANIZATIONS?

| Primary Challenges                       | % of Participants Mentioning Comment |
|--|--------------------------------------|
| <b>Staffing</b>                          | <b>46.02</b>                         |
| <b>Money</b>                             | <b>39.20</b>                         |
| Training/education/experience/skill      | 7.39                                 |
| Leadership (administration/management)   | 7.39                                 |
| Public influence & perception            | 6.25                                 |
| Equipment & resources                    | 6.25                                 |
| Politics                                 | 5.68                                 |
| Mental health & fatigue                  | 3.98                                 |
| Lack of public understanding & awareness | 3.98                                 |



## Federal and State *Linking the Challenges*

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WHAT ARE THE  
**CHALLENGES** TO  
THE SUCCESS OF  
ORGANIZATIONS?

- Staffing
  - Diversity
  - Recruitment (younger generations)
  - Salary
  - Training
  - Retention
- When budgets are cyclic, staffing is cyclic.
  - Makes long-term planning hard

“**Staffing**, our IMTs are **understaffed and over worked**. ...the workforce is made up of more and more of ADs (retirees) -- it is an **unsustainable model**.”

“Appropriate level of staffing for the long term. The **cyclic budgets** don't allow us to build an organization that is trained and prepared to deal with today wildfire and fuels problems.”

“**Funding fluctuations**, difficulty finding **experienced fire personnel** that also have education to meet our self-imposed standards for qualified fire management personnel.”

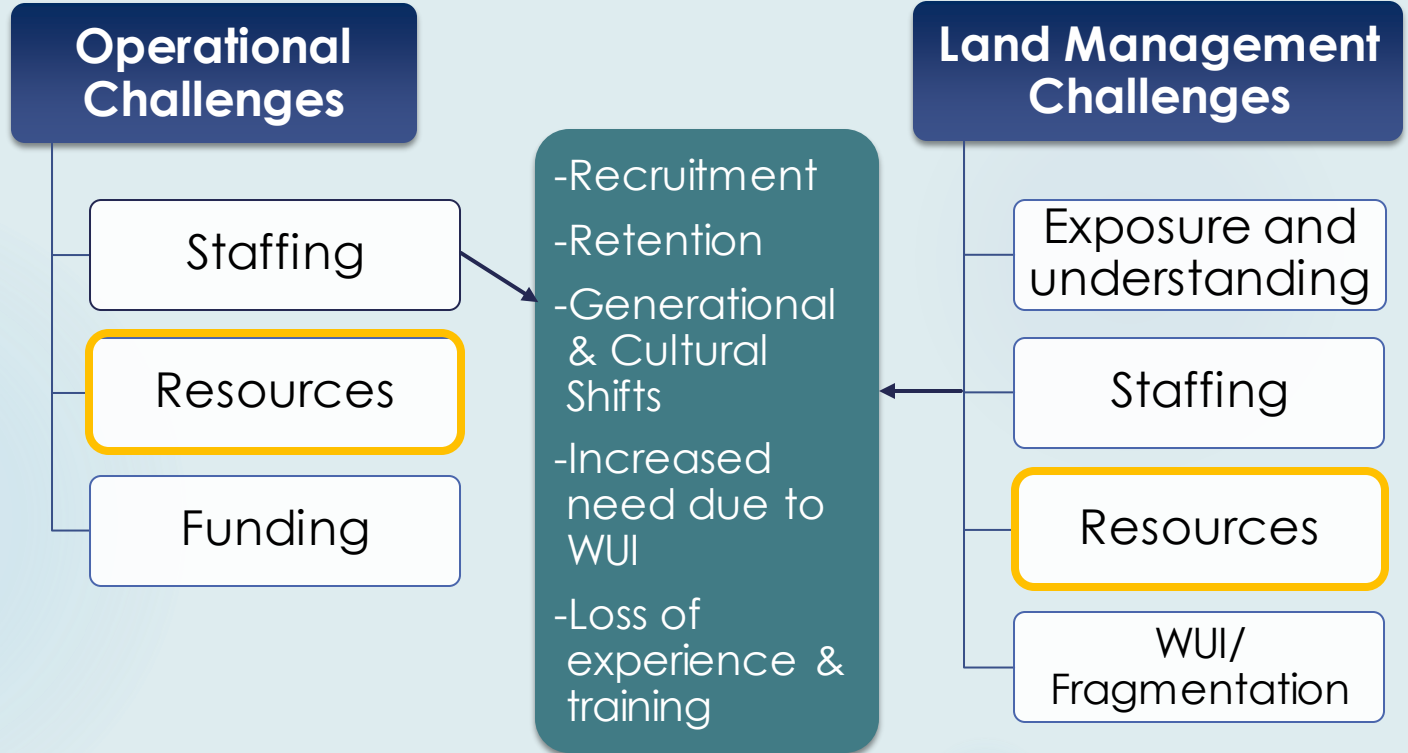


# Local Fire Managers

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WHAT ARE THE **CHALLENGES** TO THE SUCCESS OF ORGANIZATIONS?



# Summarizing Key Findings

## WILDFIRE RISK & CONCERNS

- ▶ Fire managers at all levels were concerned that wildfire risks and associated hazards are increasing.
  1. Wildfire severity
  2. WUI, fuel and land management
- ▶ More federal and state managers were concerned about climate change and its relationship to wildfire risk than local managers.
- ▶ The WUI, fuel and land management, and increasing population are a larger concern for fire managers across all organizational levels than climate change.

## TOOLS & DECISION-MAKING

- ▶ The NWS and Mesonets are by far the most popular sources of information for all
- ▶ Fire managers at all levels focus more on forecasts < 1 week



- ▶ Despite high concern for climate change increasing wildfire risk, federal and state fire managers do not consider it in decision-making or planning

## PRESSURES

- ▶ Funding, immediate threats, and political pressures prominent at the federal and state level.
- ▶ Local organizations feel pressure from local politics. However, most pressure comes from the public and landowners.

## CHALLENGES

- ▶ Staffing was the primary challenge for organizations at all scales; also mentioned as top risk concern
  - Followed by money for Federal and State
  - Resources and education for local





# Moving Forward

- ▶ Additional analysis
  - ▶ Policies, successes, needs
- ▶ Focus on pressures and challenges
  1. Funding sources and stability
    - ❖ Allow for long-term planning and mitigation
    - ❖ Improve staffing
  2. Educating those funding sources, the public, and landowners
    - ❖ Improving communication and messaging
- ▶ Prioritize fuel and land management

# Thank you!

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*Special thanks to participants, my PhD Committee, the Oklahoma Mesonet, and the OU Department of Geography & Environmental Sustainability!*