

Understanding how firefighters make decisions in the field

**Timothy Brown¹, Tamara Wall¹,
Tami Parkinson², Nicholas Kimutis¹**

¹Desert Research Institute, Reno, Nevada, USA

²USDA Forest Service, McCall, Idaho, USA



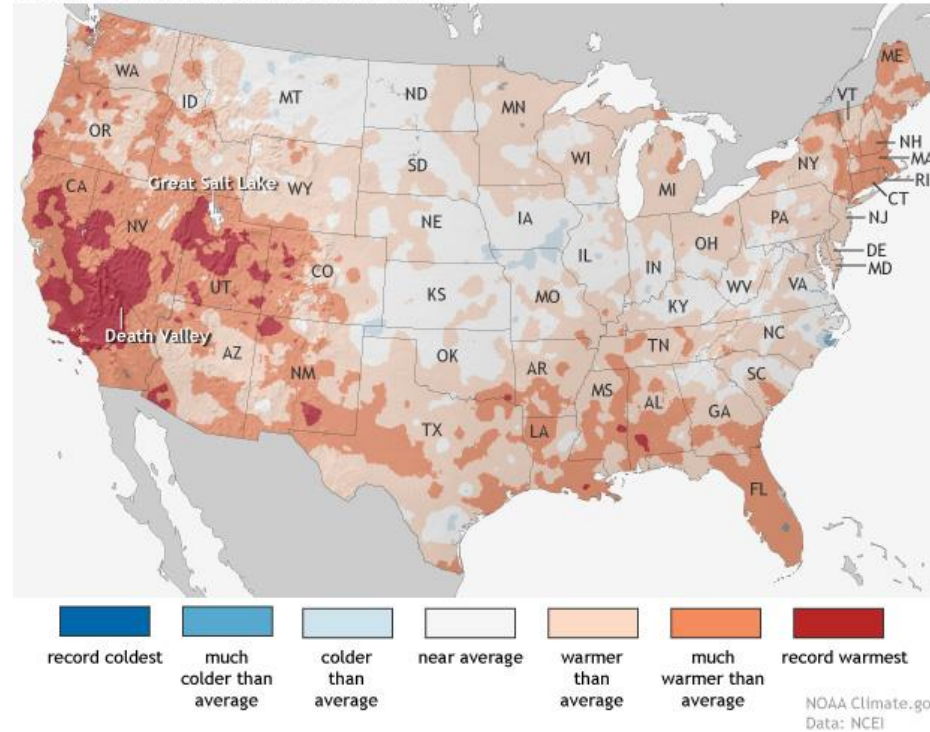
Shaping factors of fire

Shaping factors of fire extremes in a changing world

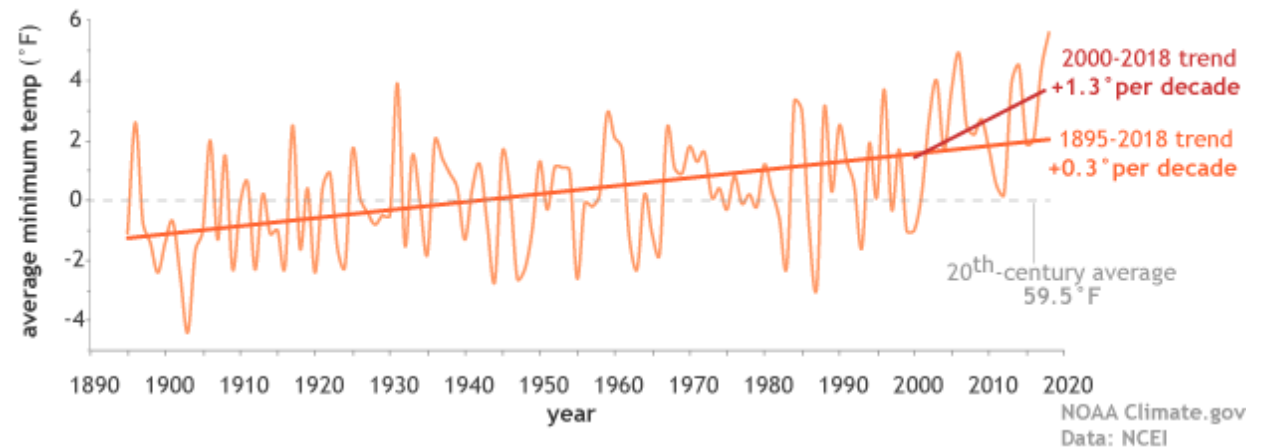
- Climate – weather extremes
- Fuels – historical management practices
- People – land use activities and expectations

An emerging climate shaping factor

Average overnight low temperature in July 2018

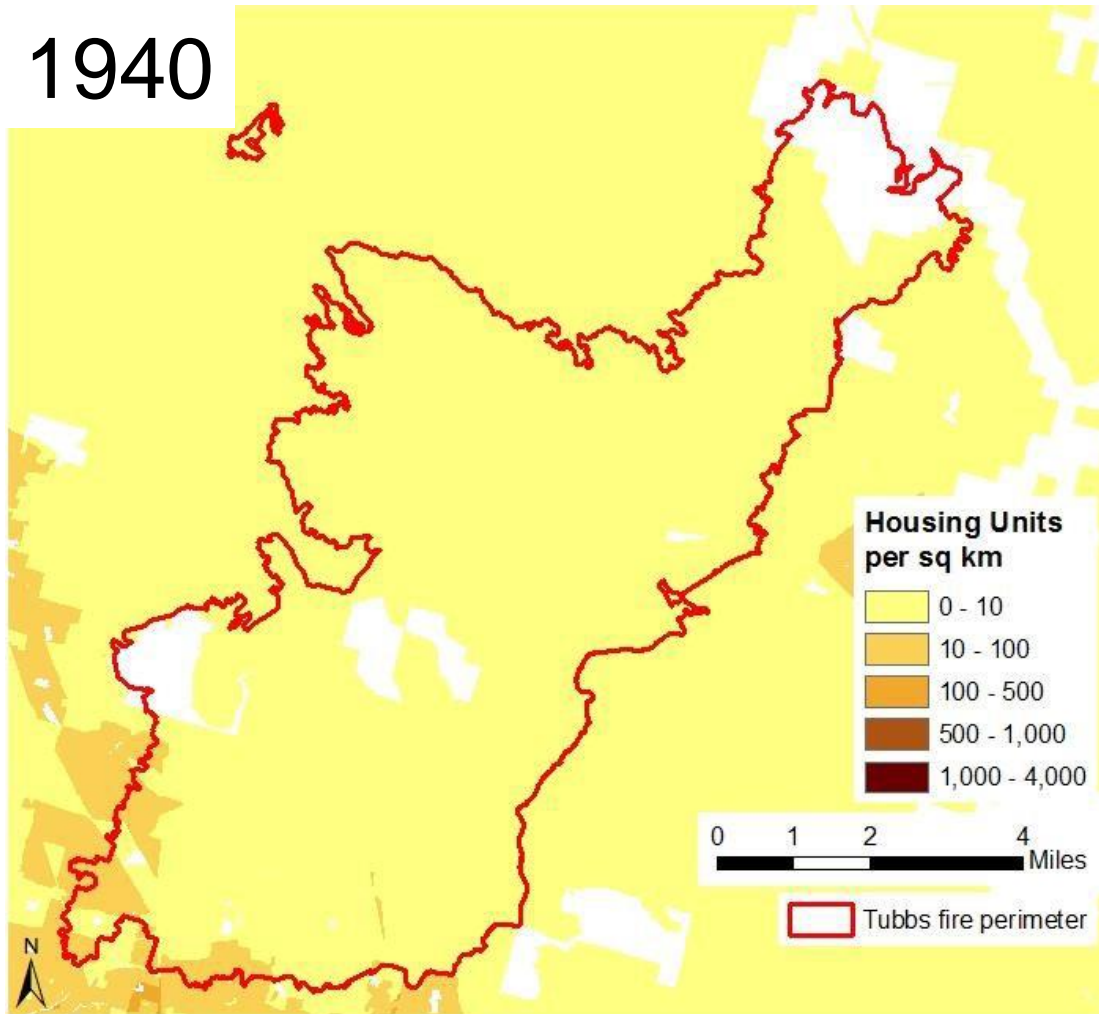


July overnight low temperatures in California over time (1895-2018)

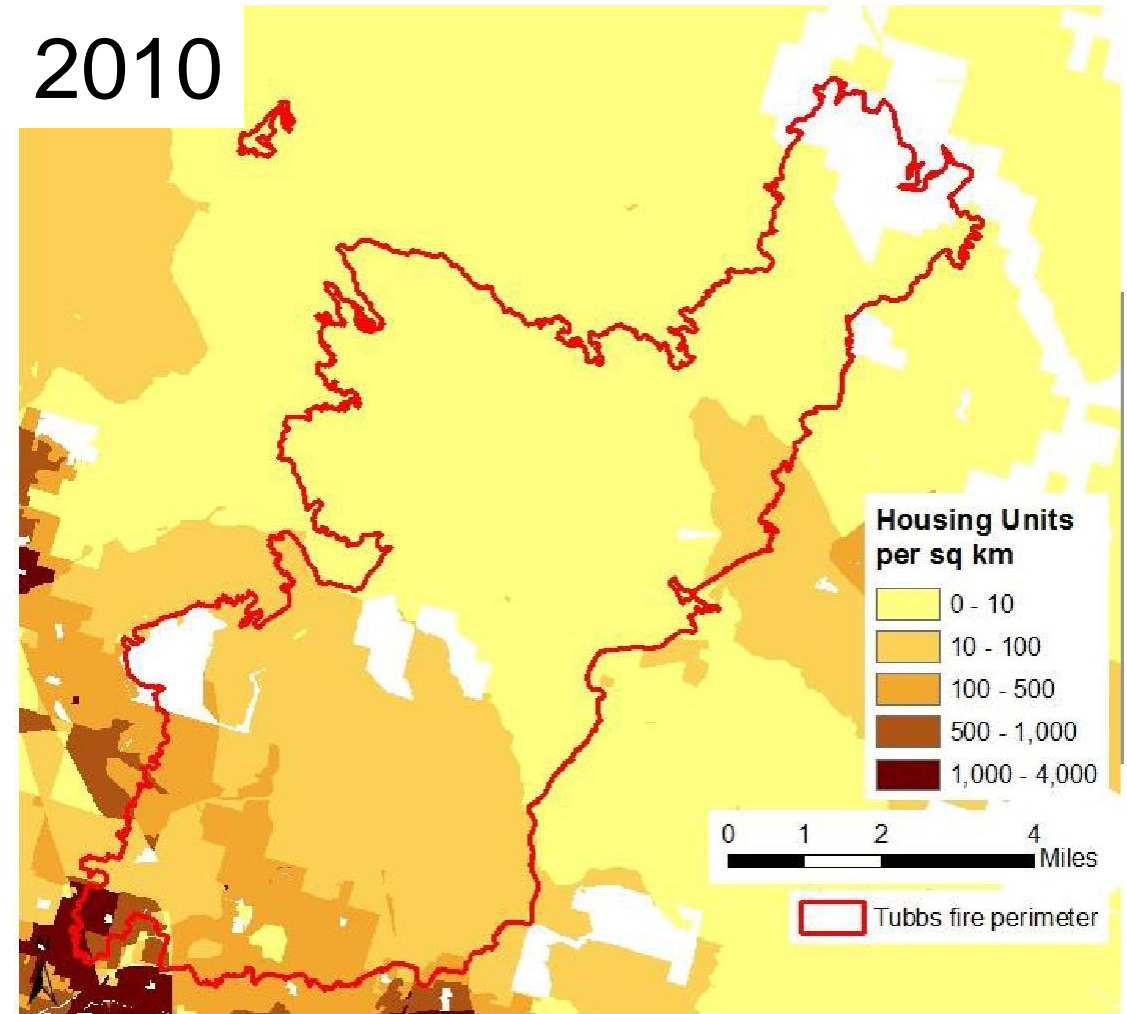


Santa Rosa population expansion

1940



2010



Changes in the fuel landscape

1909



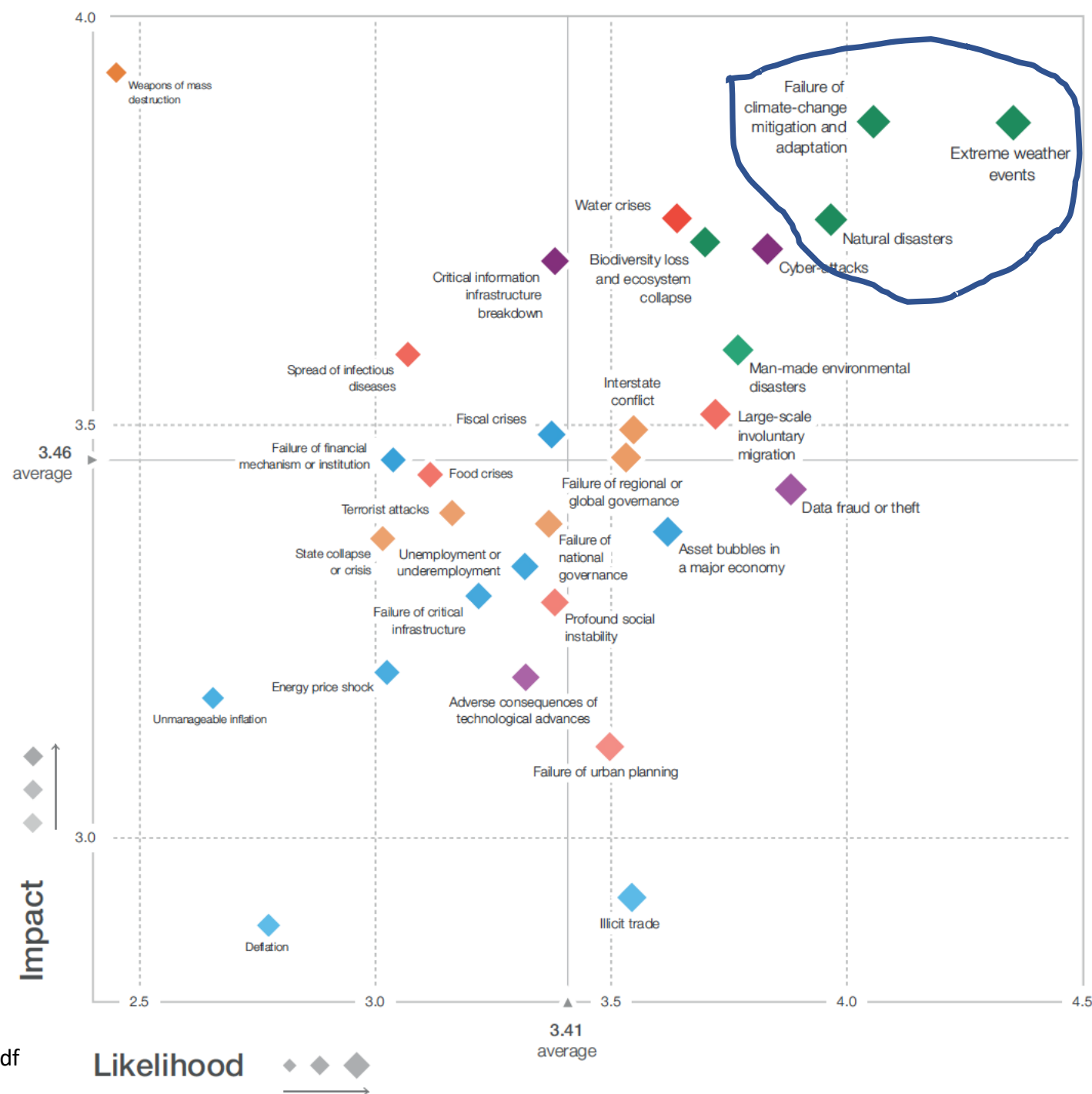
1979



Photos taken in Bitterroot National Forest, Montana

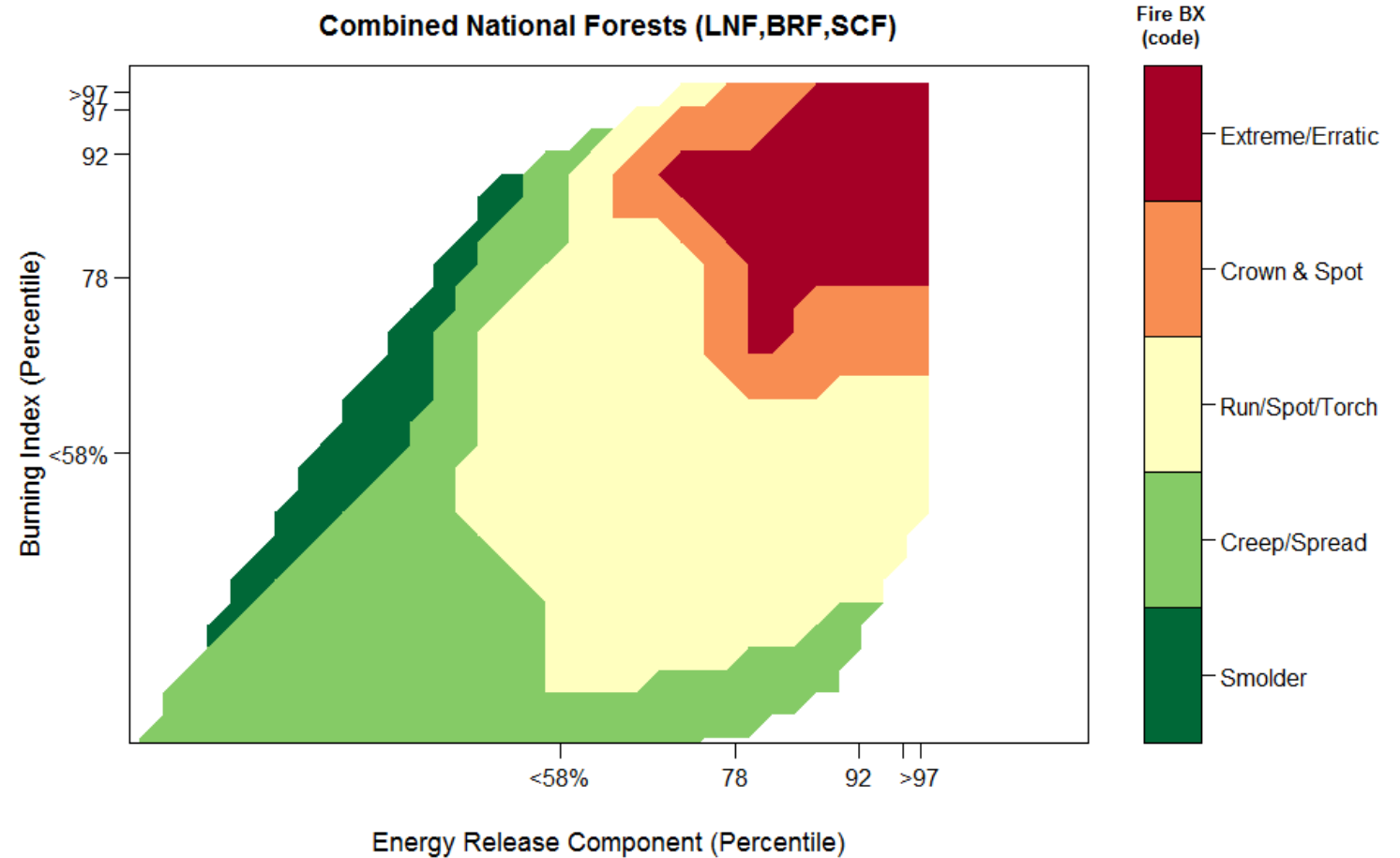
The global risks landscape 2019

World Economic Forum 2019 report



When extreme fire behavior takes place

Increased erratic wildfire behavior events ->
Greater likelihood of increased numbers of
firefighters required to respond, often in
emergent situations



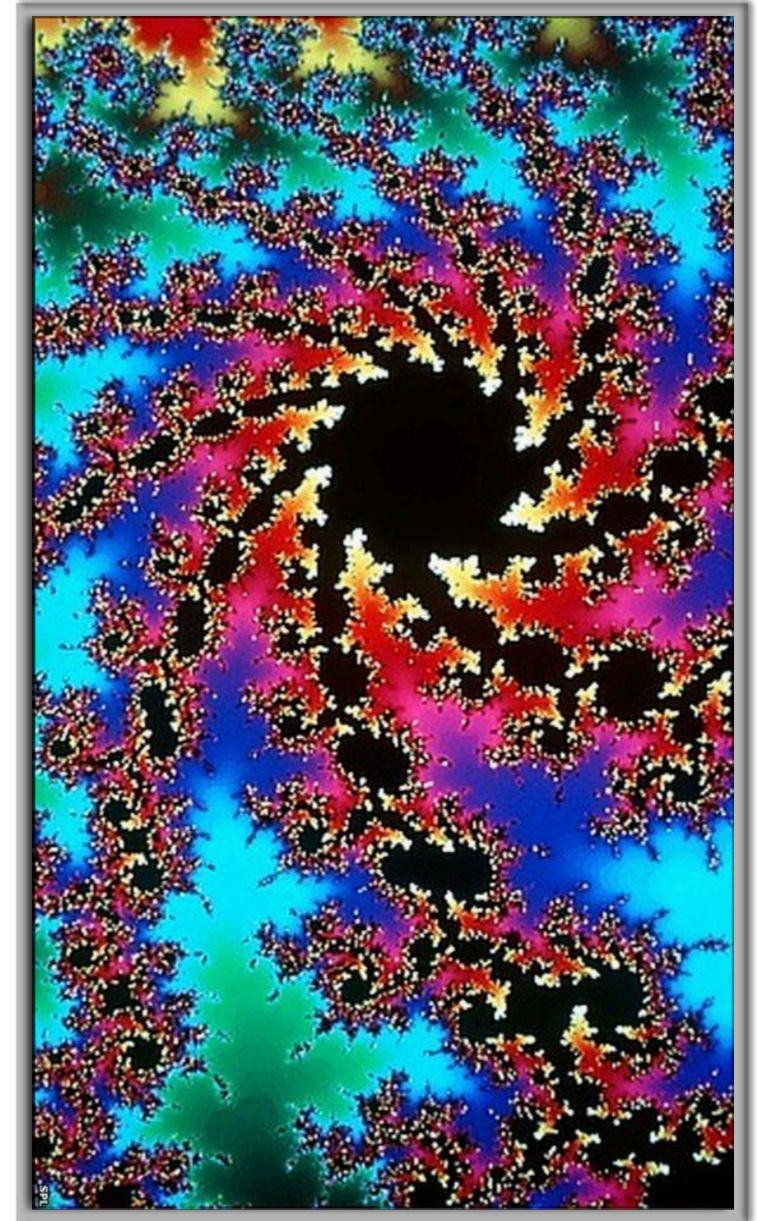
Perceptions of risk

Understanding how firefighters make both good and bad decisions while engaged with an active fire is central to understanding how perceptions of risk are utilized by firefighters in decision making

- Critical drivers and tradeoffs between safety, getting the job done, and risk

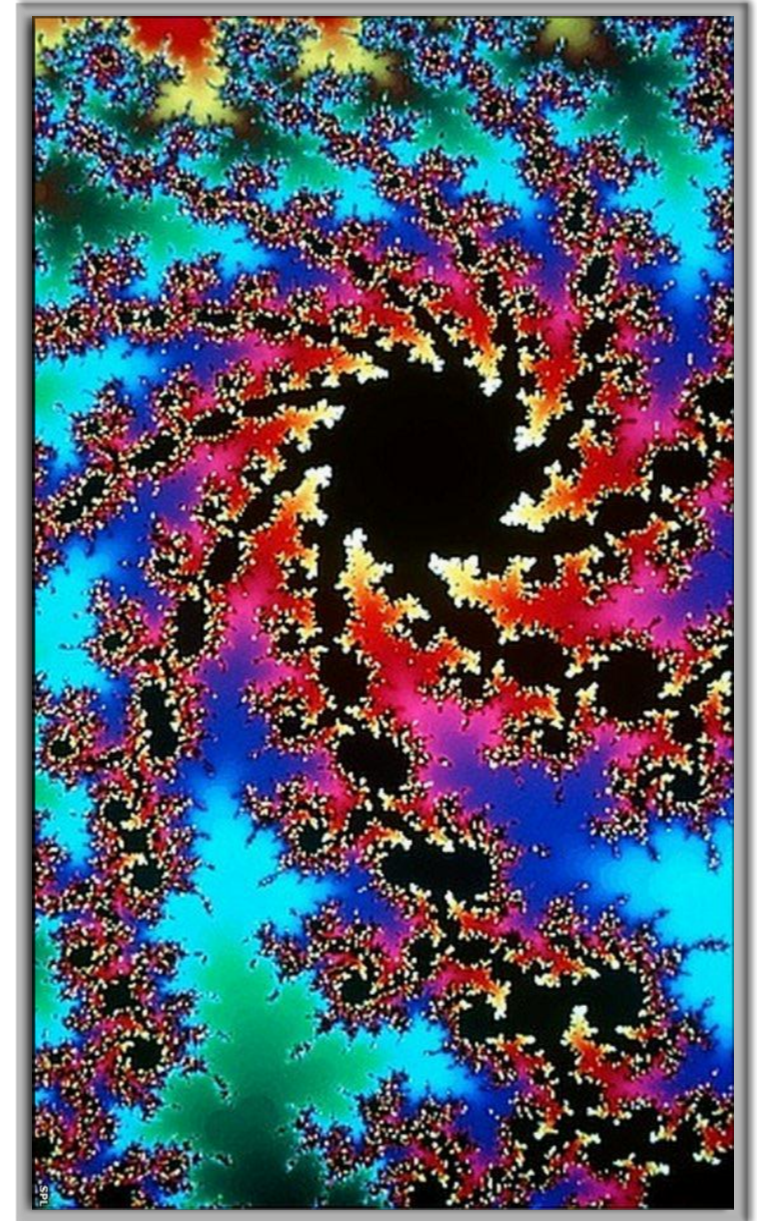
Method

Sense making methods seek to perceive patterns that allow to identify points where behaviors/actions (desirable or undesirable) can be affected



Method

- Micro stories
- Multiple platforms for data collection
- Unlimited data points
- Mixed qualitative/quantitative

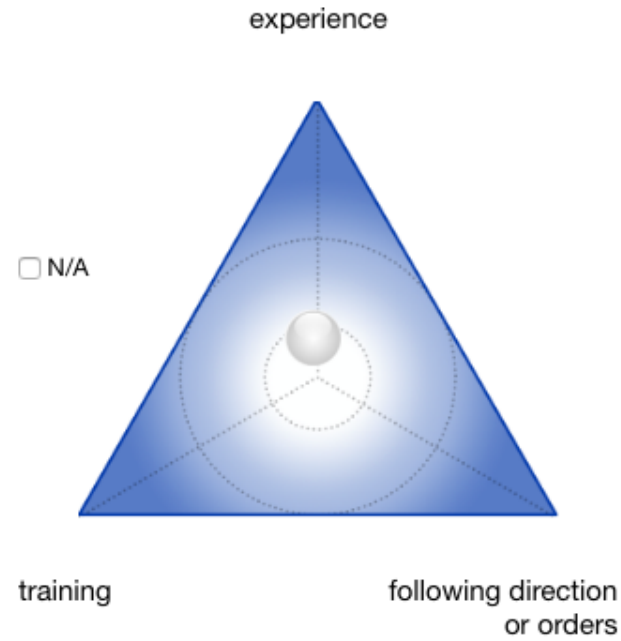


Method

2008: Northern California. First shift as task force leader. Inversion didn't break until approximately 1530. Fire in a canyon approximately 1200 ft below. Briefed that previous shift it was on the 'other' side of the drainage and therefore was not aligned with our location. Due to the days inversion could not see the exact fires location. At approximately 1530 the inversion broke. Visibility still poor. Fire had progressed across the drainage and established itself on the slope below resources location. Promptly observed an increase in fire behavior. Pulled all resources (approximately 200 personnel) to safety zone. When the fire approached our location a rolling vortice was observed. One RV lost and a few out buildings. No structures lost and more importantly no injuries sustained.

Method

Thinking about the story you just shared, please answer the following questions:
People in the story acted based on...



In this story...

Resources were...

never available when
needed

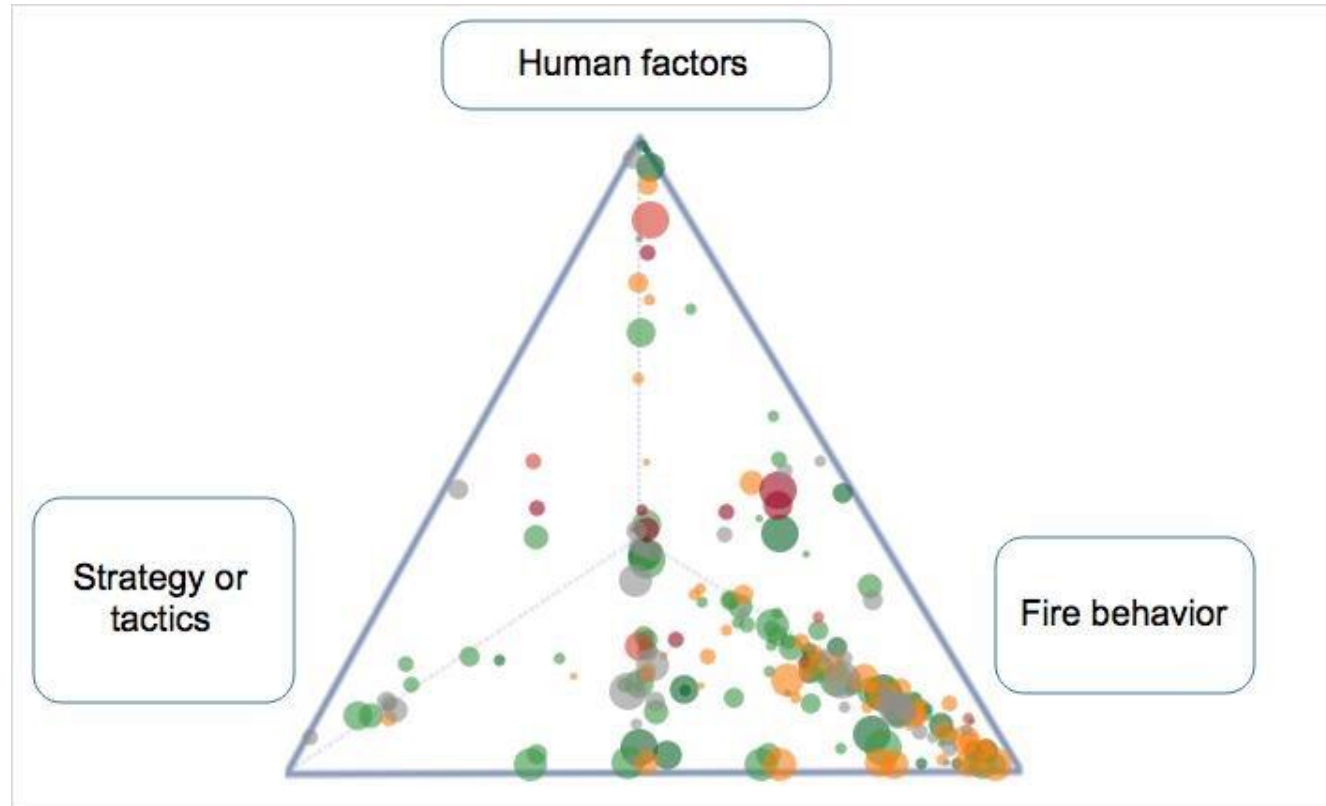
☐ N/A



so abundant they got in
the way

Previous results

Events in this story were driven by...



Years of fire experience at time of story

- less than 1
- 1-3
- 4-5
- 6-8
- 9-10
- 11-15
- 16 - 20
- 20+

What was the overall impact of the story you shared

- not sure
- strongly negative
- negative
- neutral
- positive
- strongly positive

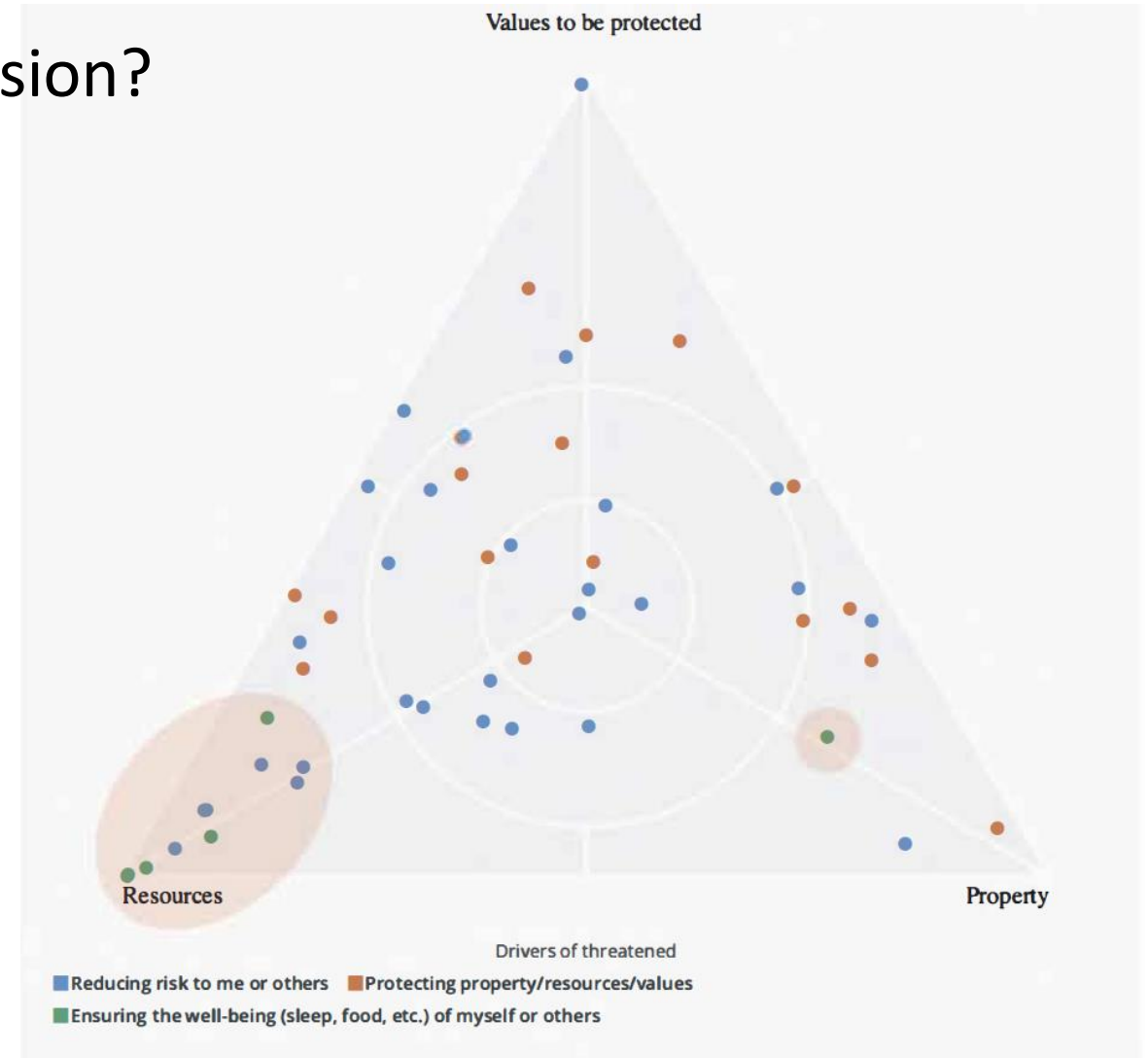
Previous results

Stories with negative outcomes related to extreme fire behavior often involved protecting human life and following orders (rather than responding based on experience or strategy/tactics)

Very preliminary results

In this story, what influenced your decision?

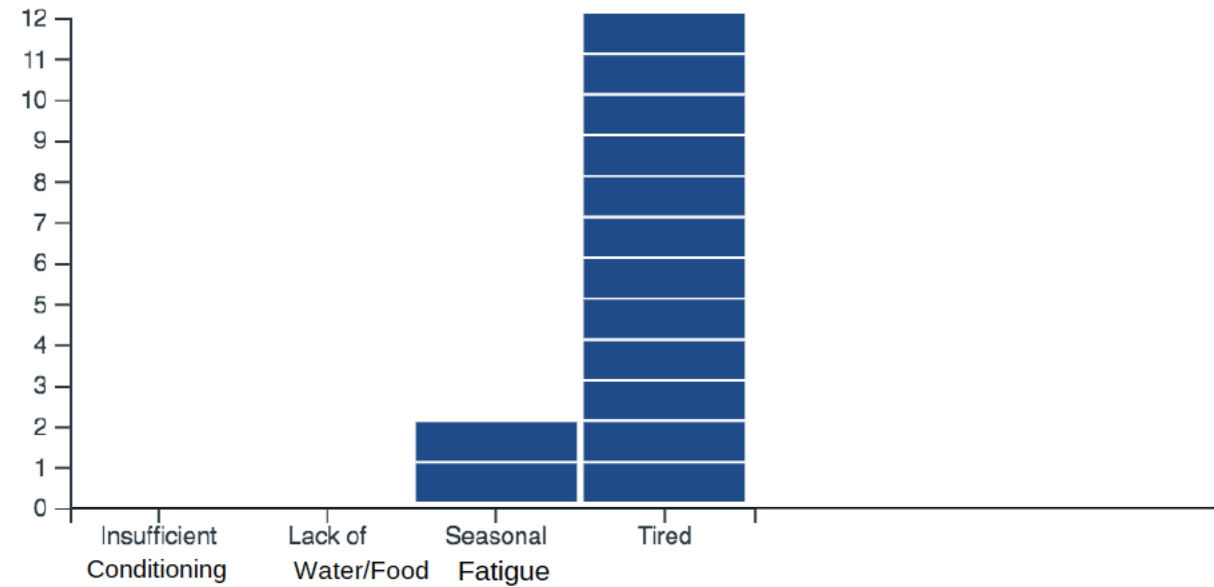
- Small number of decisions closely related to well-being
- Almost all linked to resources
- Almost nothing tightly signified to property or values to be protected



Very preliminary results

Tired was a factor in several of the stories

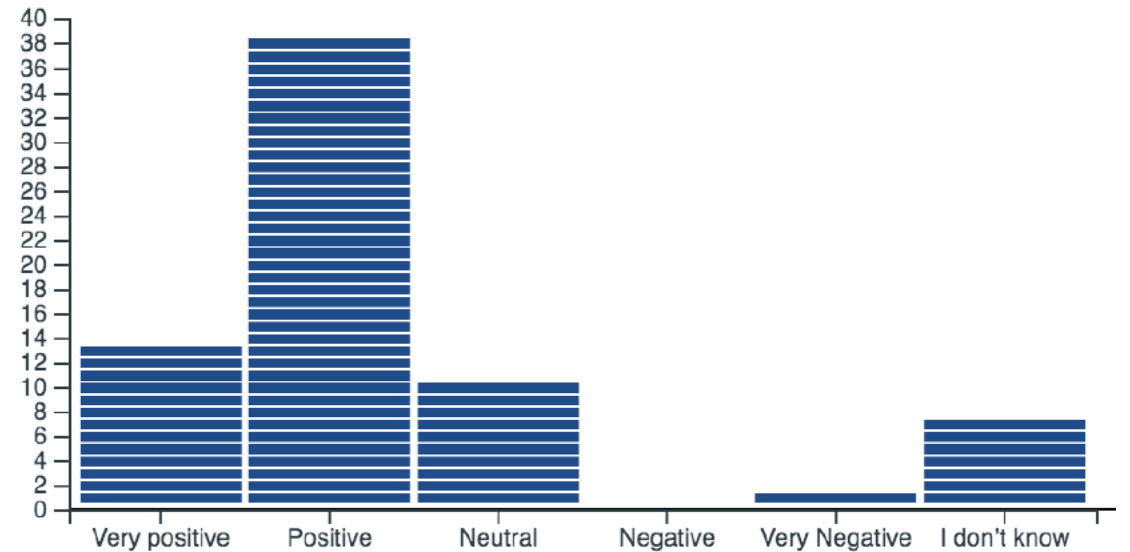
Were any of the following a factor in your story? (select any that apply)



Very preliminary results

The majority of decisions were thought of as having positive impact – outcome was positive

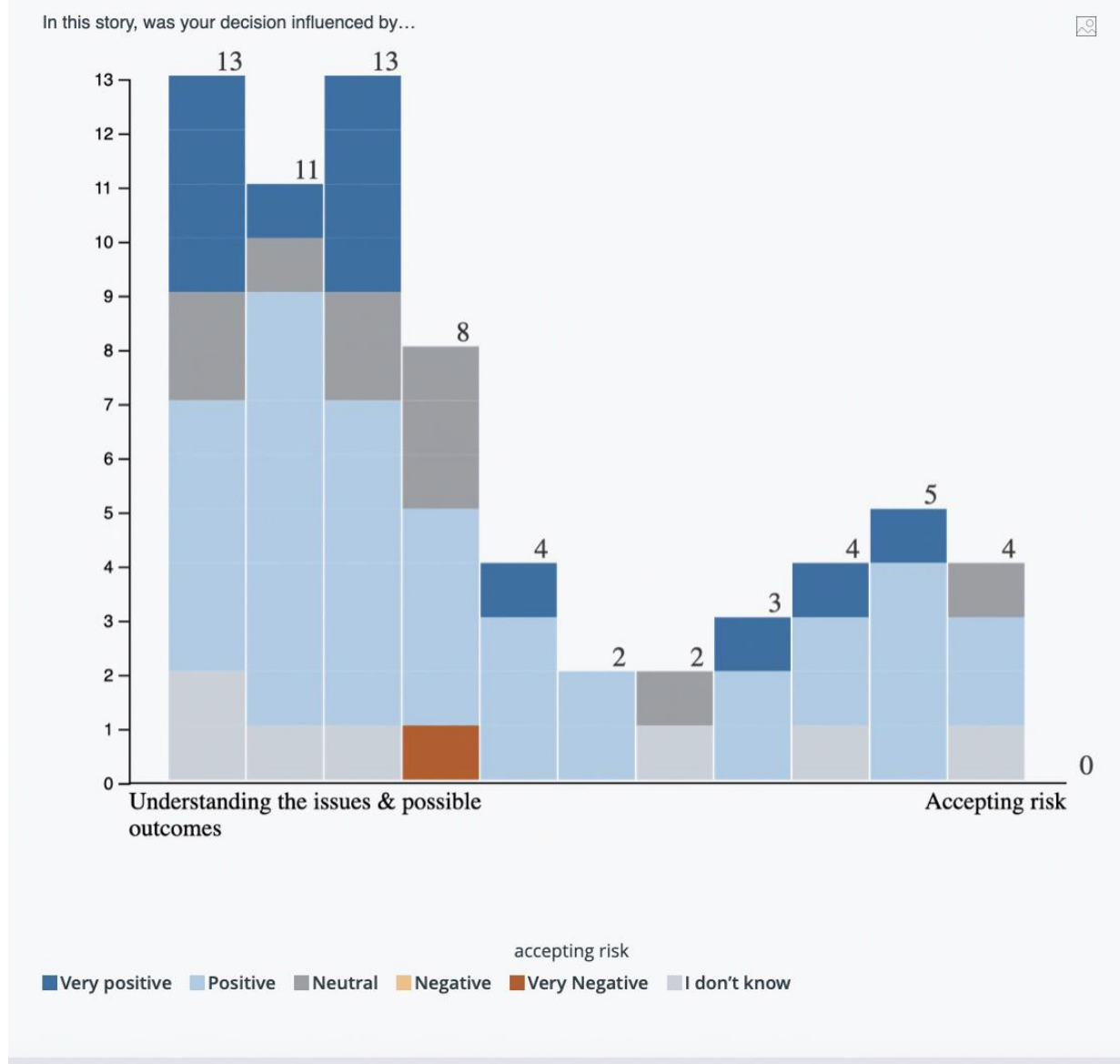
What was the overall impact of your decision?



Very preliminary results

Majority of decisions influenced by – understanding the issues & possible outcomes

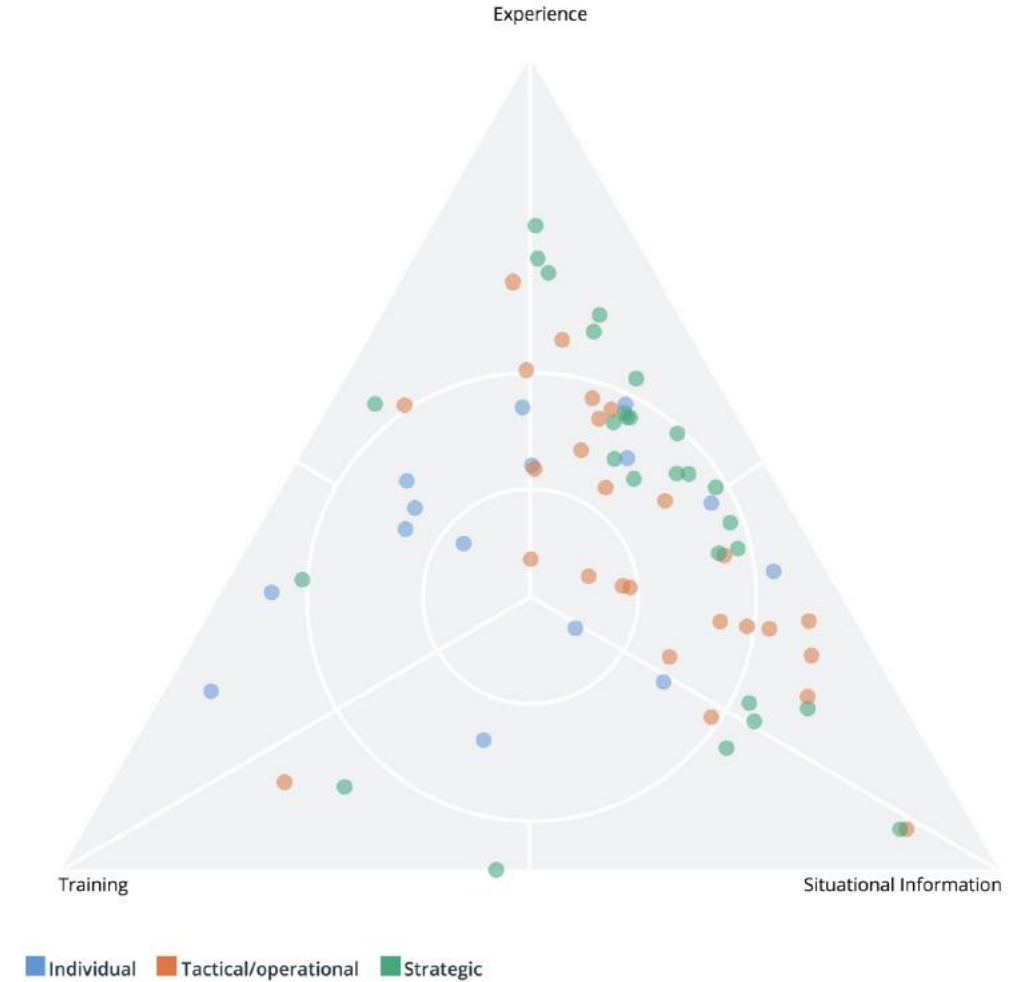
A small number of decisions influenced by – accepting risk



Very preliminary results

Majority influenced by both experience and situational information

In this story, what influenced your decision?



Summary

- Understanding the issues and possible outcomes influence the majority of decisions
- Majority of decisions were influenced by experience and situational information, not training
- Accepting risk influenced a small number of decisions
- Big question – what should training comprise of in an era of extreme events?

Next steps

- Collect more stories in 2020
- Identify and invite a fire practitioner group to collaboratively analyze the data
- Key questions –
 - Given trends or patterns what are the implications on policy, decision making, and training
 - What are the limitations of a small dataset?
 - Is the sense making methodology valid for the questions being asked?
 - If valid, how to improve data collection (cost and sample size)?

Can you see the forest for the numbers?

Tobia Ravà.
Codici Trascendentali

