Wildfire Evacuation Modeling and Analysis

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Spatial Lightning Talk, HDMA, SDSU

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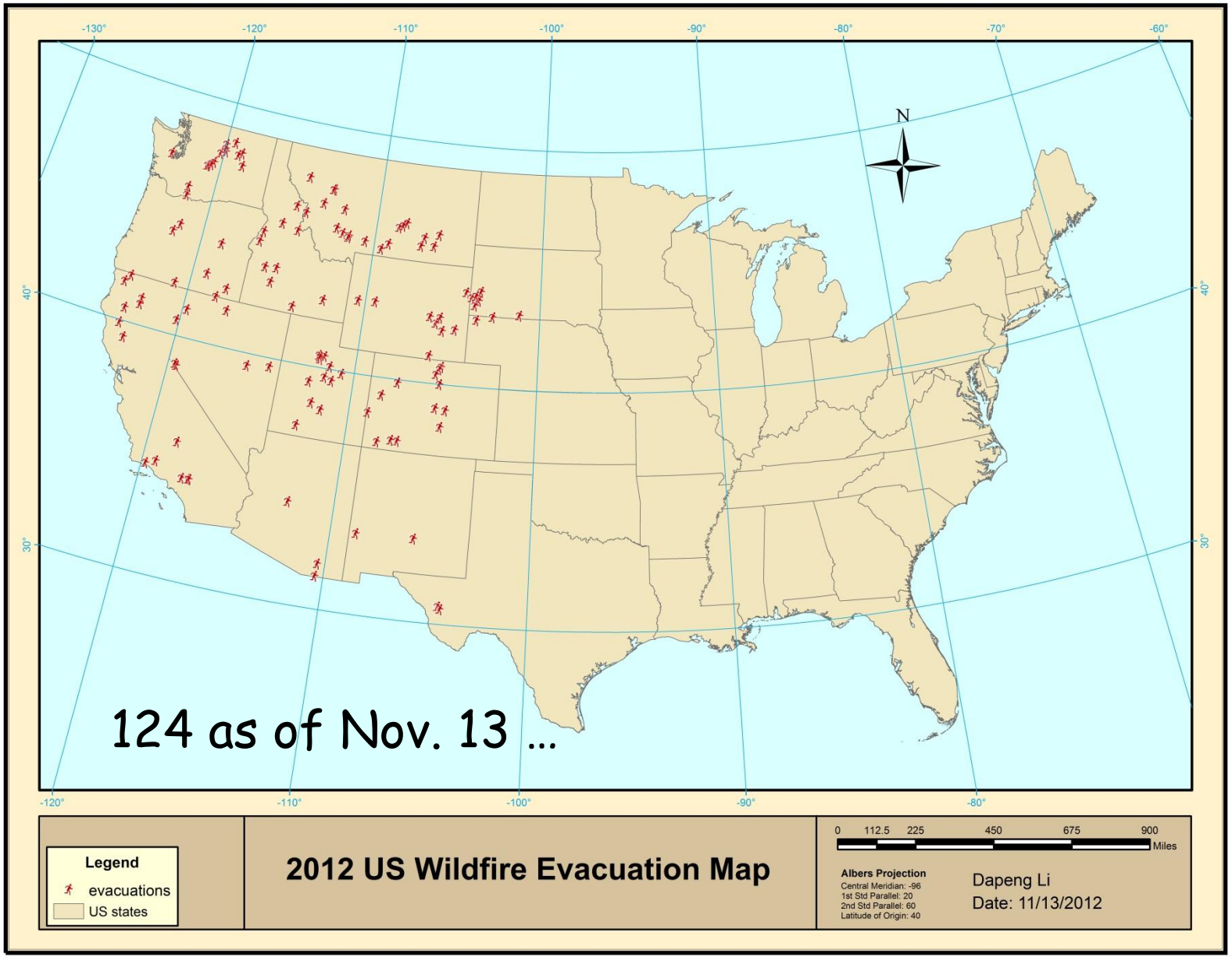
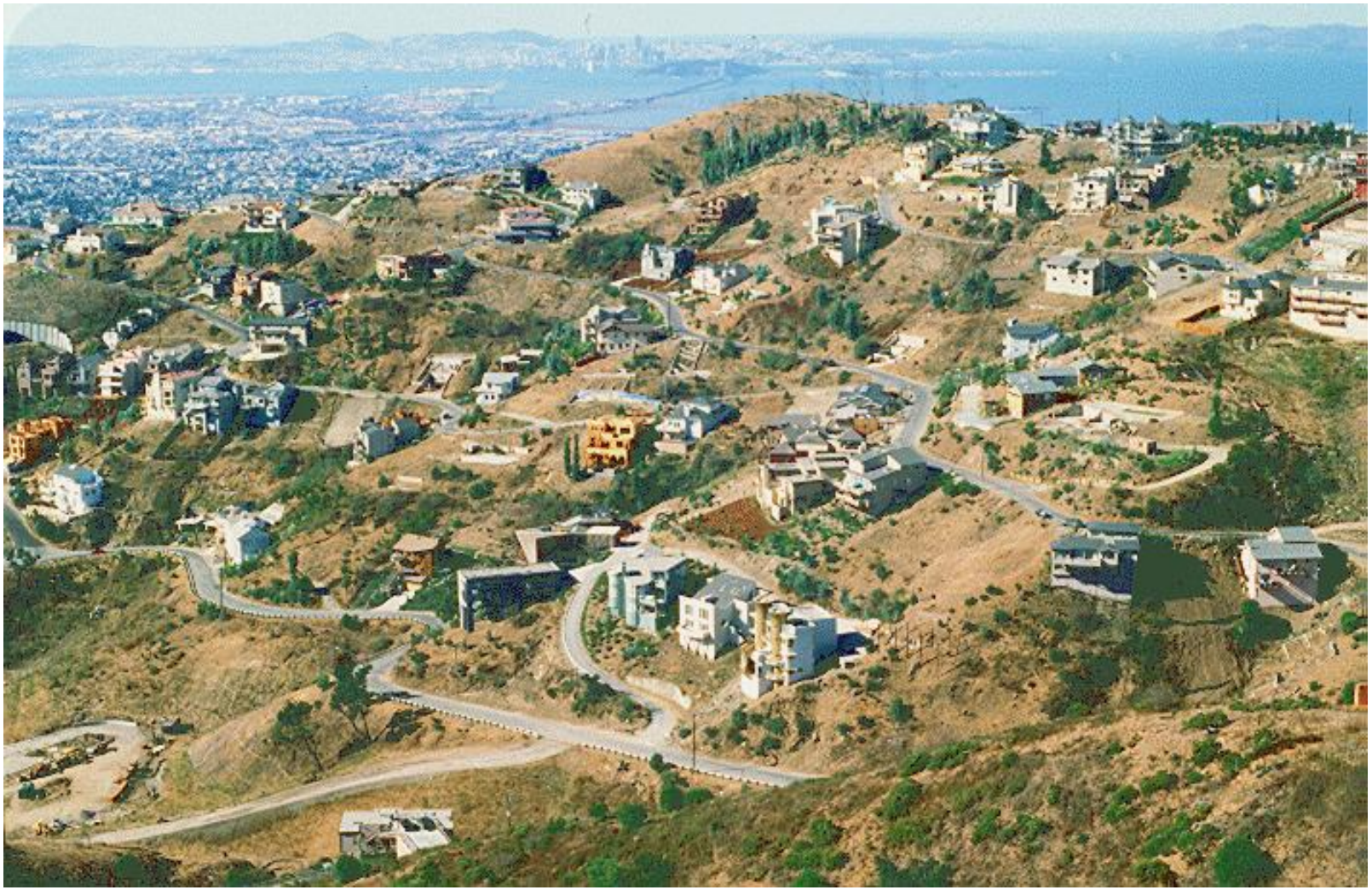
Center for
NATURAL AND TECHNOLOGICAL HAZARDS
THE UNIVERSITY OF UTAH

C^{nth}


-130°
-120°
-110°
-100°
-90°
-80°
-70°
-60°
40°
30°
N
124 as of Nov. 13 …
-120°
-110°
-100°
-90°
-80°
Legend
evacuations
US states
2012 US Wildfire Evacuation Map
0 112.5 225 450 675 900
Miles
Albers Projection
Central Meridian: -96
1st Std Parallel: 20
2nd Std Parallel: 60
Latitude of Origin: 40
Dapeng Li
Date: 11/13/2012

Oakland Fire – October 1991



October 20, 1995

Where are the low egress communities in fire-prone areas of the western U.S. and how bad can they get?

Evacuation Vulnerability Measure

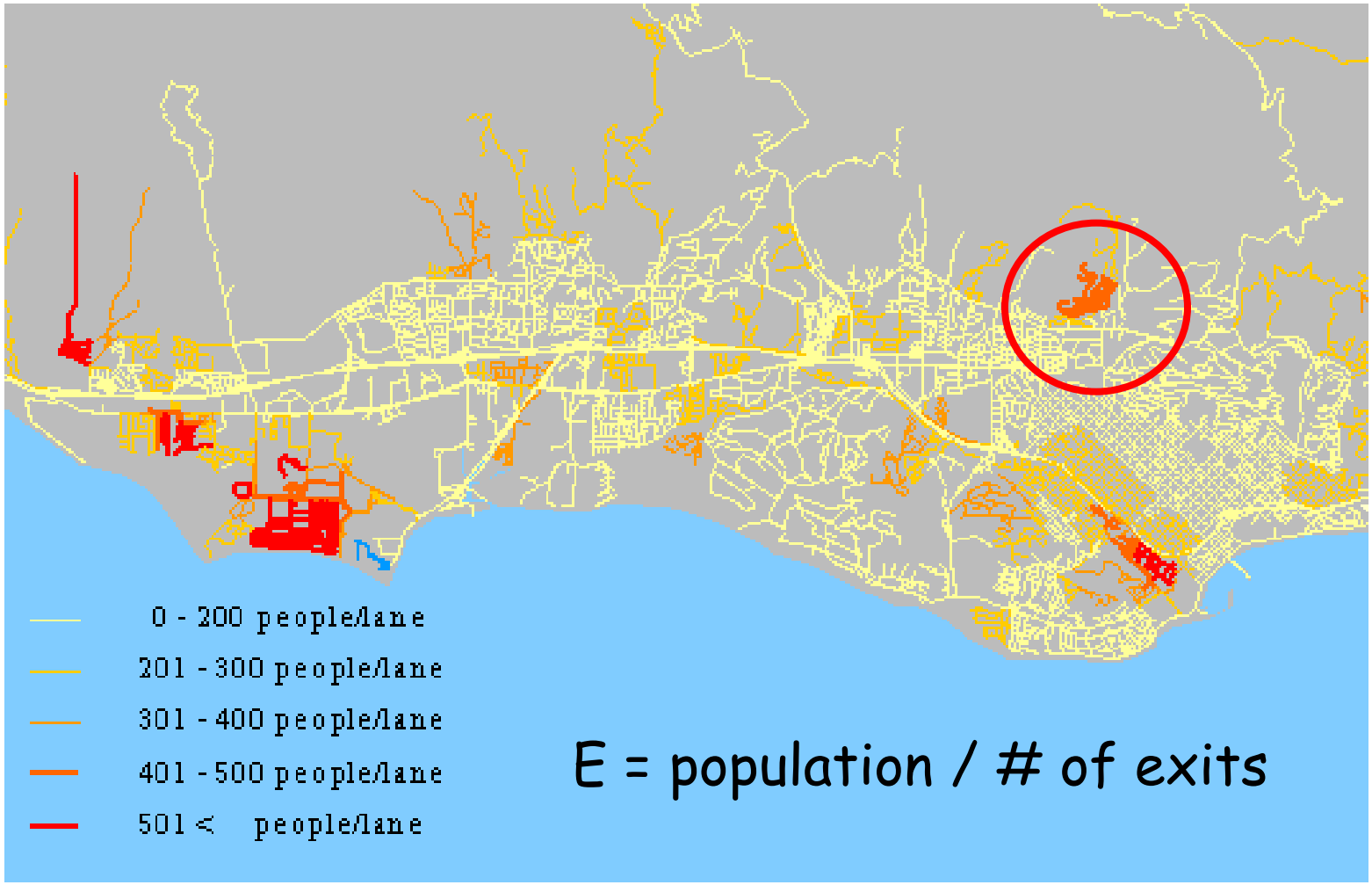
$$e = p / c$$

e – evacuation vulnerability (households / exit)

p – people (households)

c – capacity (number of exits or lanes out)

Evacuation (egress) vulnerability map



Cova, T.J. and Church, R.L. (1997) Modeling evacuation vulnerability using GIS. *International Journal of Geographic Information Science, 117-134.*

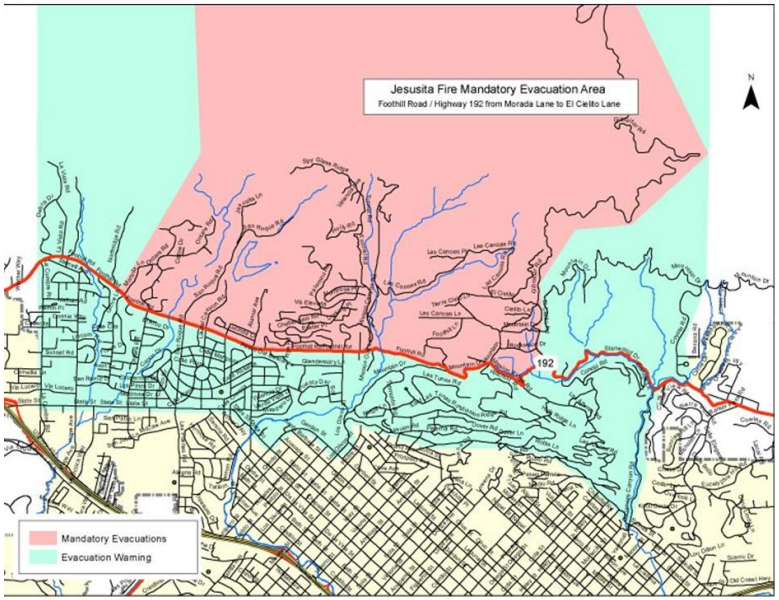
More Reports on Jesusita Fire

Traffic Deadlocked; Evacuations Confirmed; Ray Ford and Chris Meagher on Scene

Santa Barbara Independent WHO. WHAT. NOW.

Tuesday, May 5, 2009
by **INDY STAFF**

The flames are growing above Santa Barbara this afternoon, as a wildfire that seemed to start near Jesusita Trail in San Roque Canyon continues to march its way up the mountains.



Jesusita Reaches "Full-On Freak-Out Mode"

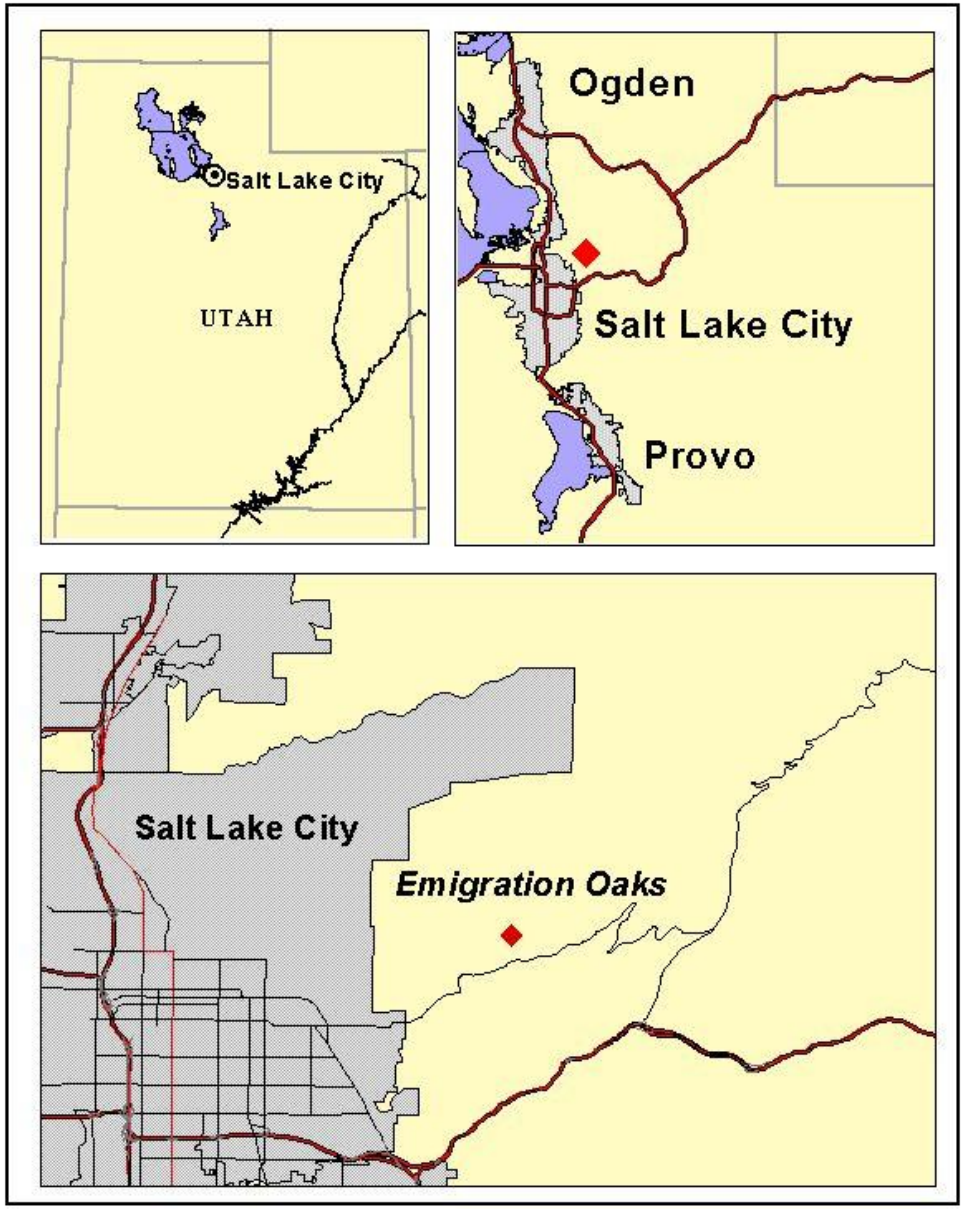
Fire Forces More to Leave Homes; Traffic Crazy on Cathedral Oaks, Foothill Road

Thursday, May 7, 2009
by **MATT KETTMANN (CONTACT), CHRIS MEAGHER (CONTACT)**

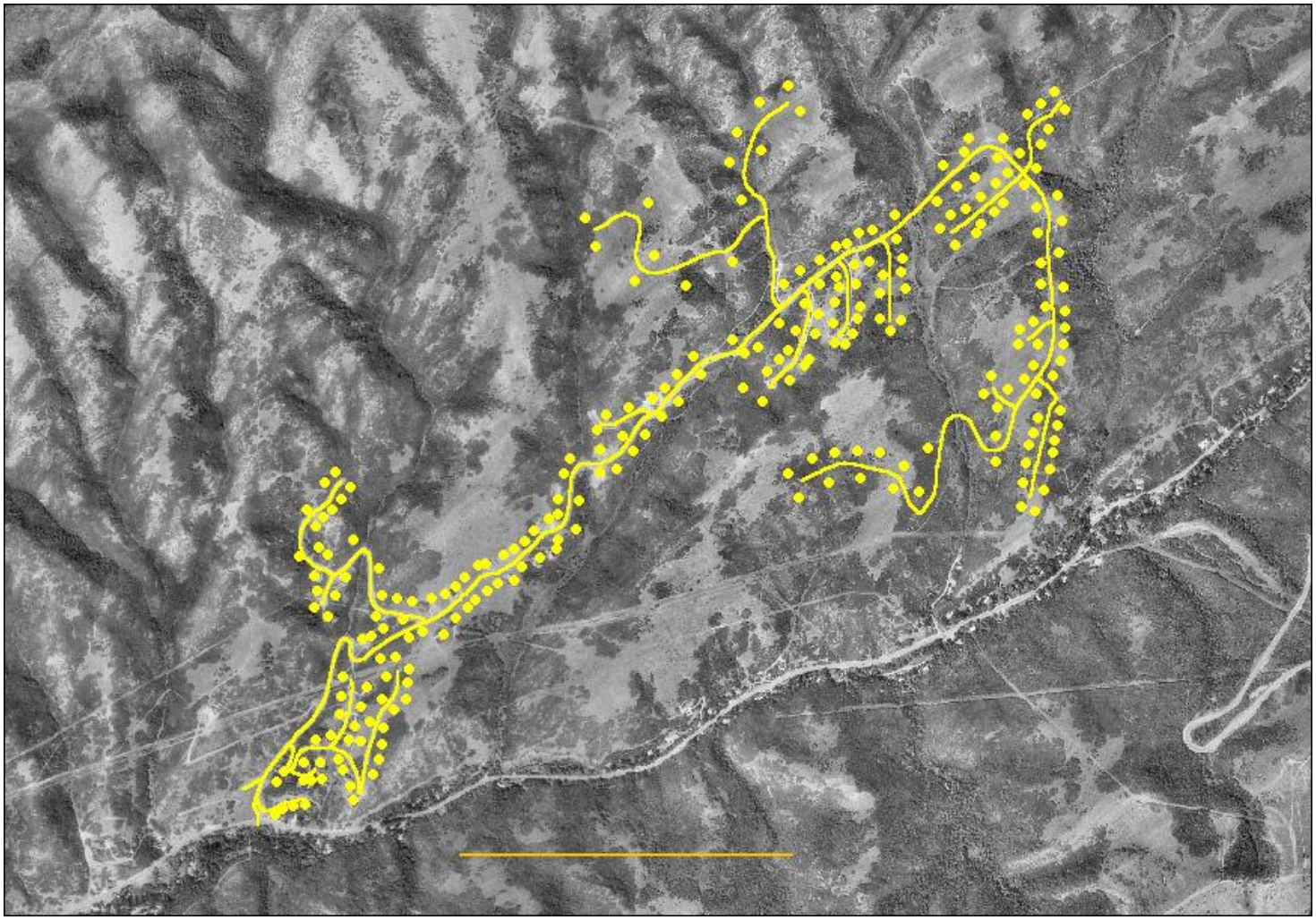
Just after official word came out that 75 residences have been burned by the Jesusita Fire, it seems that many more are in the danger zone. The fire is moving fast to the west, causing more mandatory evacuations (including Painted Cave and East Camino Cielo homes), and unconfirmed reports say that it has jumped Highway 154. Meanwhile, a mix of evacuees, stay-and-fight homeowners, looky-loos, and the media is causing traffic jams along Foothill Road and Cathedral Oaks, potentially exacerbating an already dangerous situation by blocking exit routes.

Emigration Oaks Study

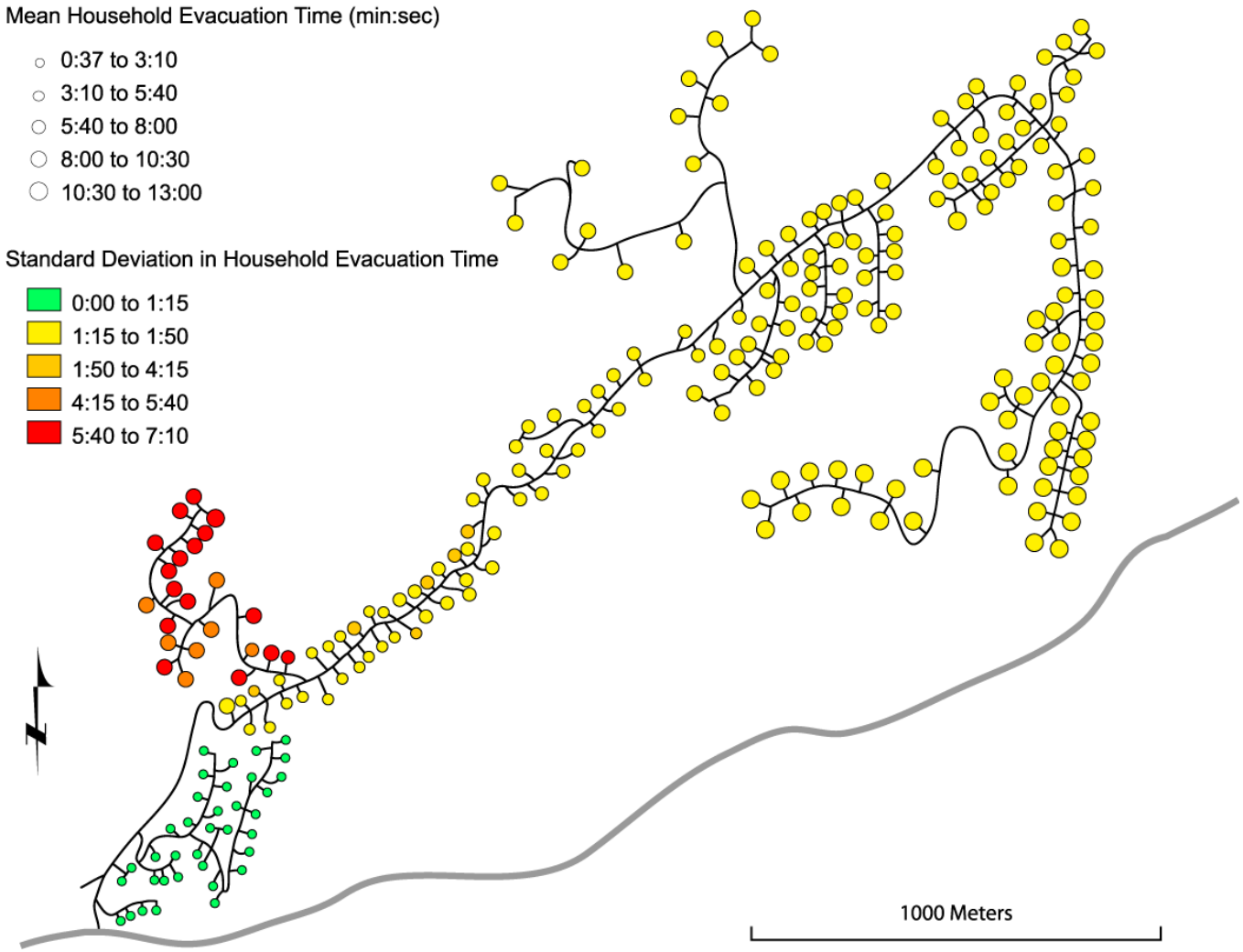
Salt Lake County, Utah



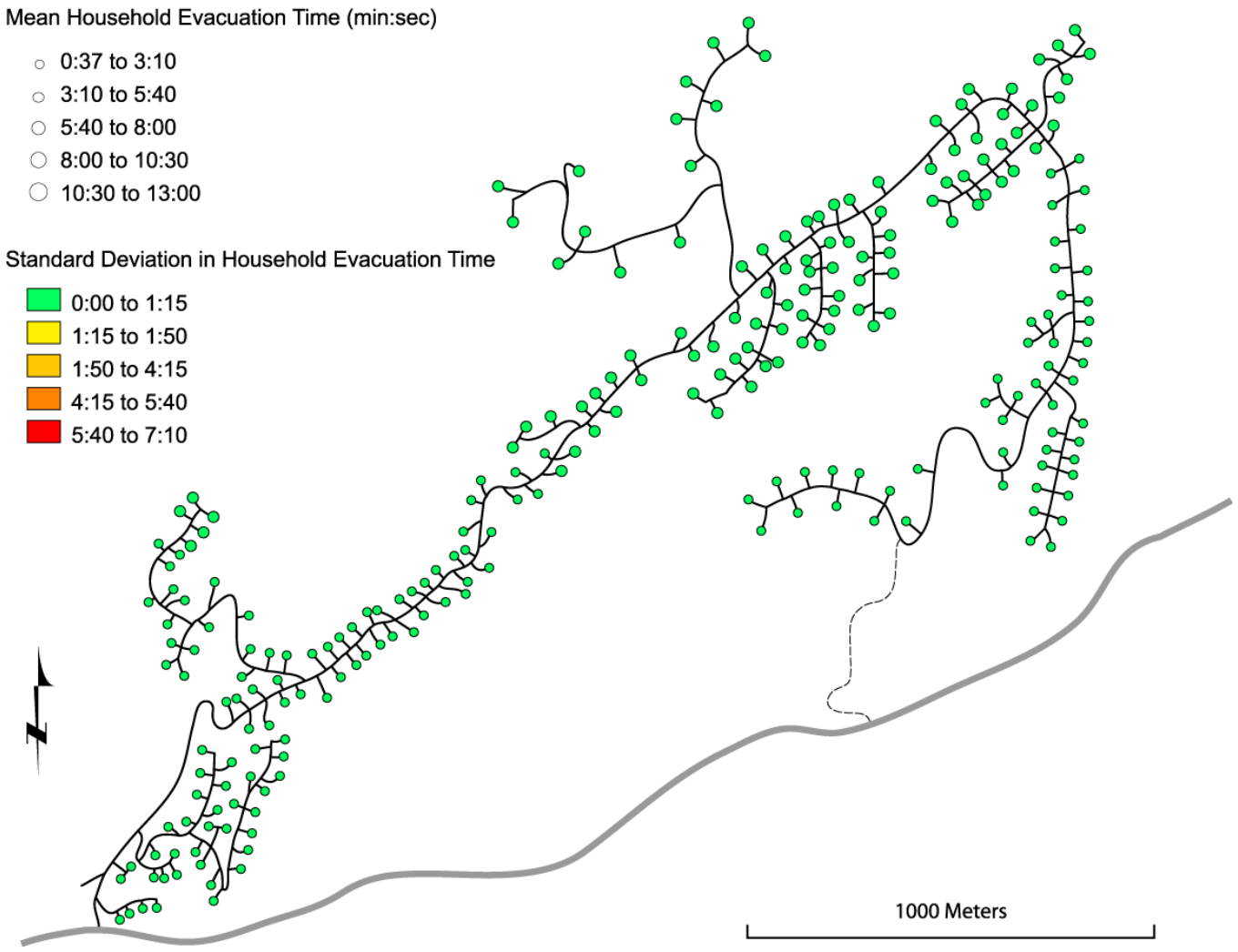
Emigration Oaks, Salt Lake County



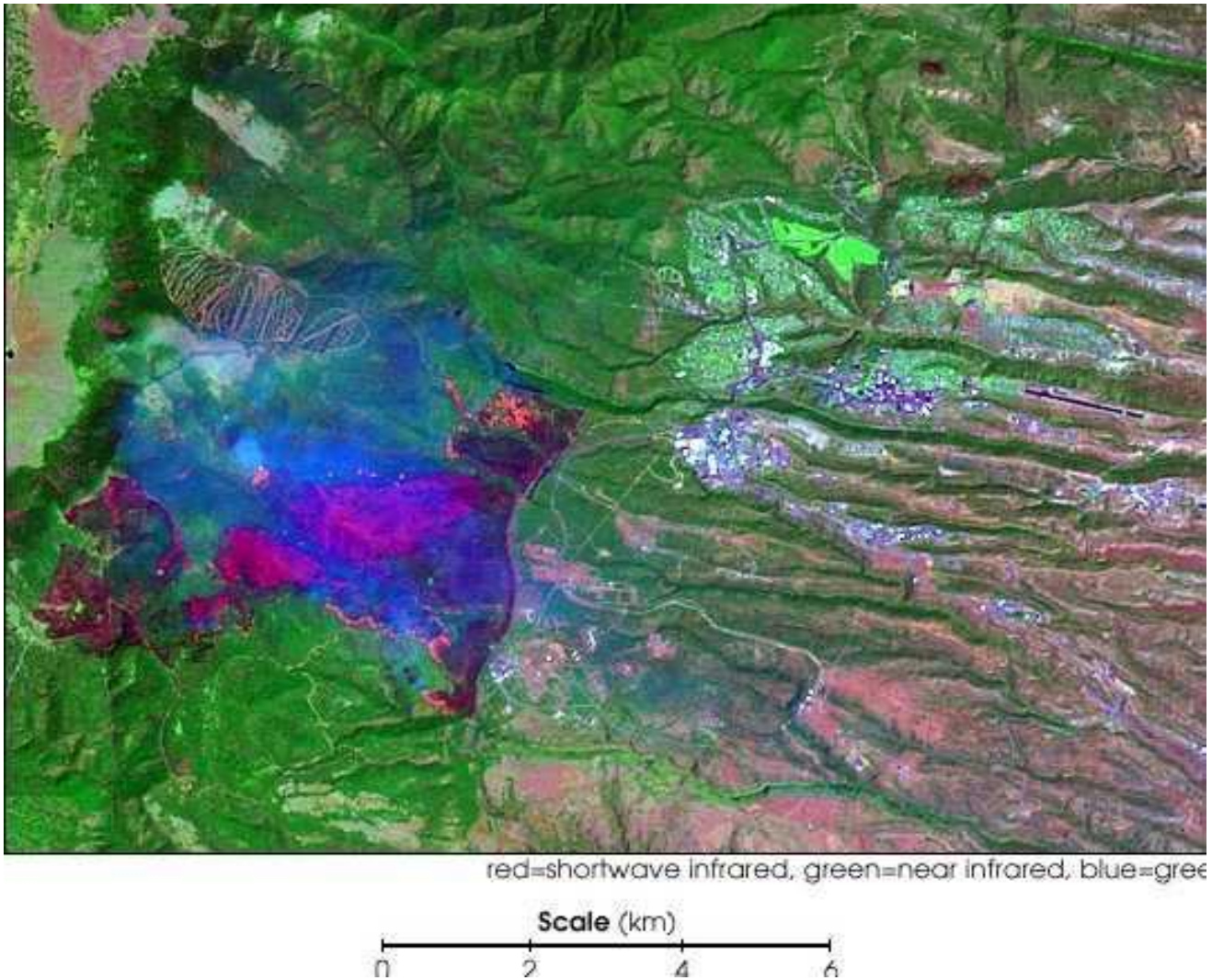
Mean household evacuation time



Mean household evacuation time

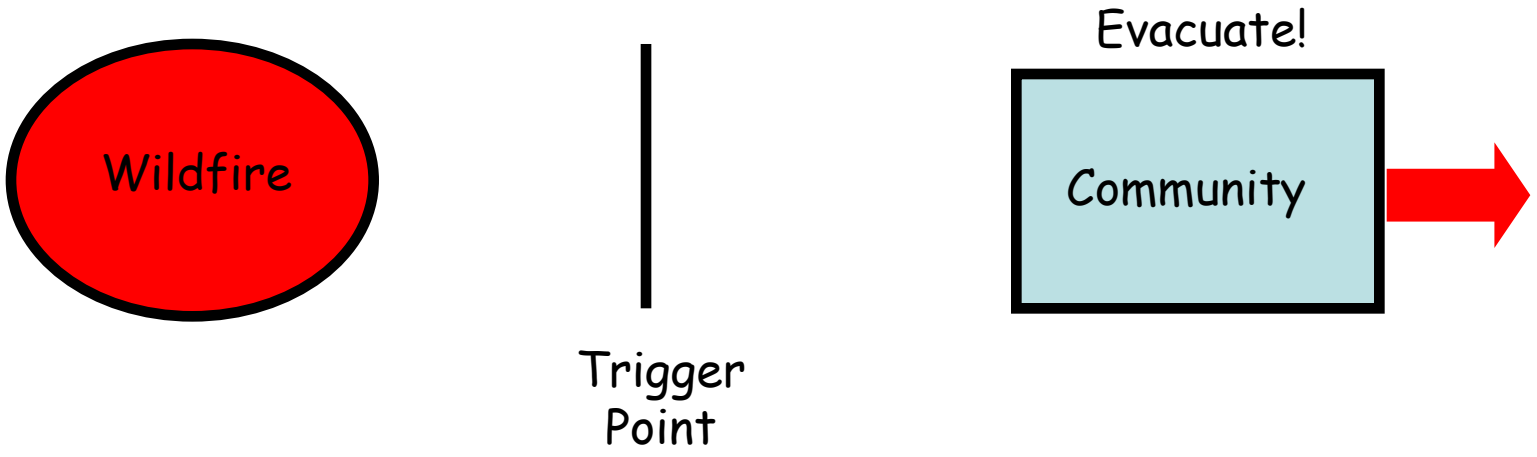


Cerro Grande Fire warning time ~ 1 week



Protective (evacuation) trigger point

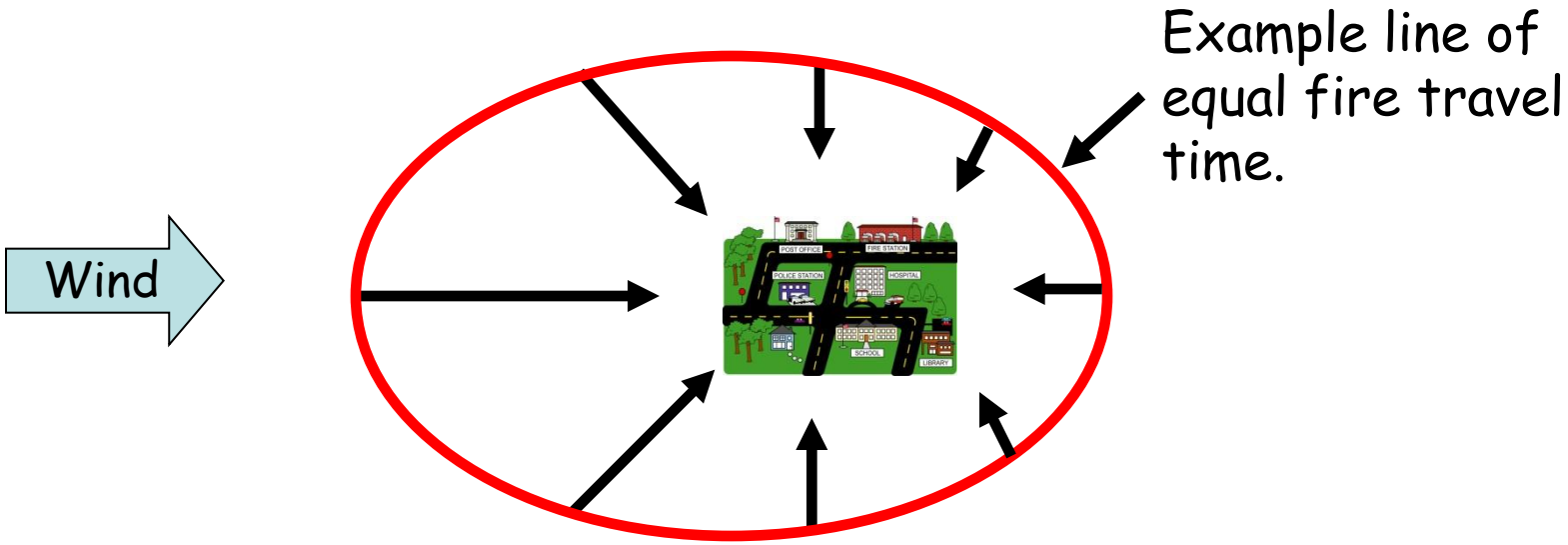
The point in space and time at which an evacuation (or other) recommendation should be issued.



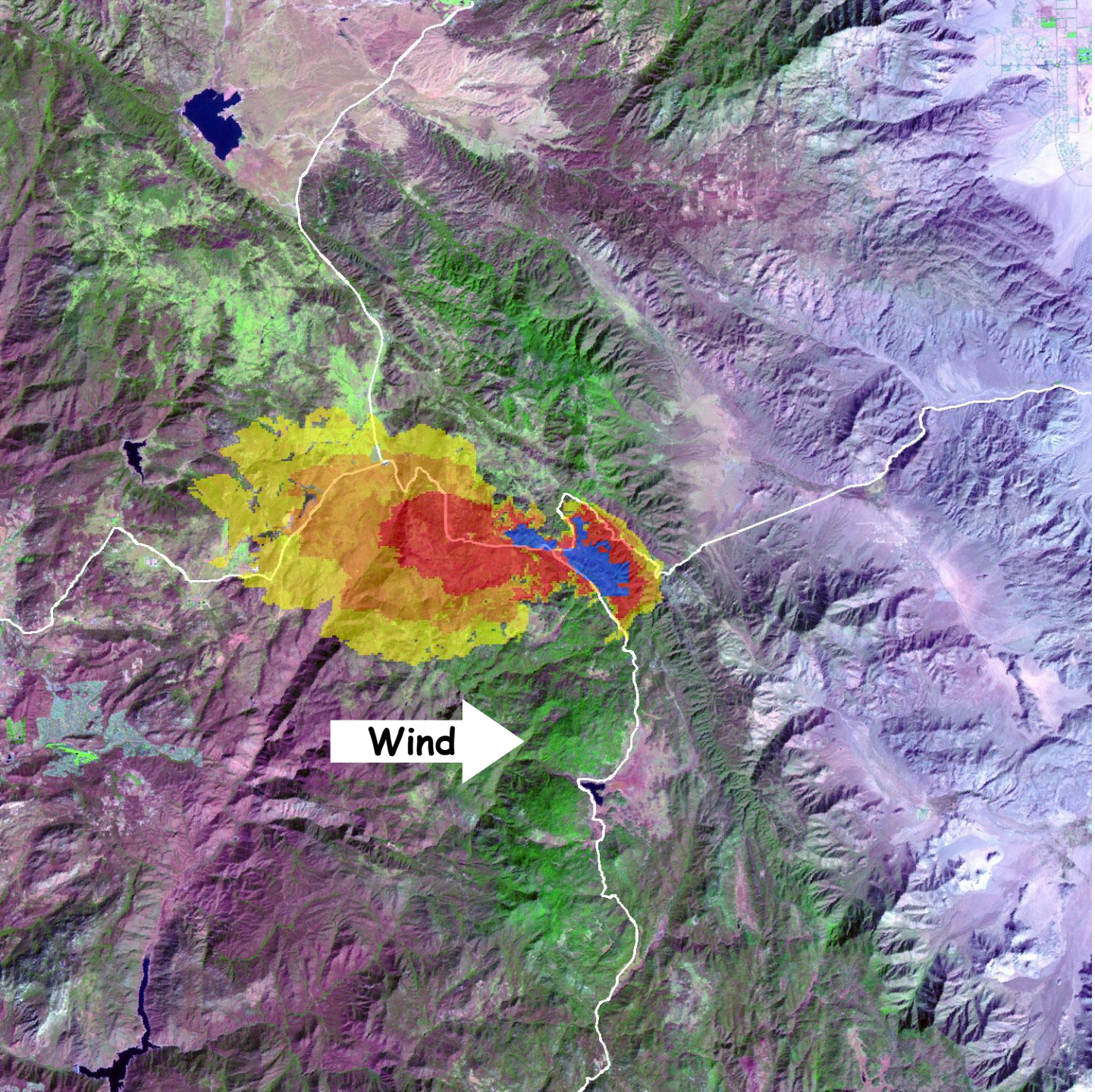
- Who should take action?
- What action should they take?
- When should they take it?

Wildfire Trigger Buffer

Model fire spread **TO** a community from all directions under given weather conditions.



Dennison, P.E. et al. (2007) WUIVAC: a wildland-urban interface evacuation trigger model applied in strategic wildfire scenarios. *Natural Hazards,* 40:181-189.



Julian Evacuation Trigger Buffers

Historical Maximum West Wind

1 hour

2 hours

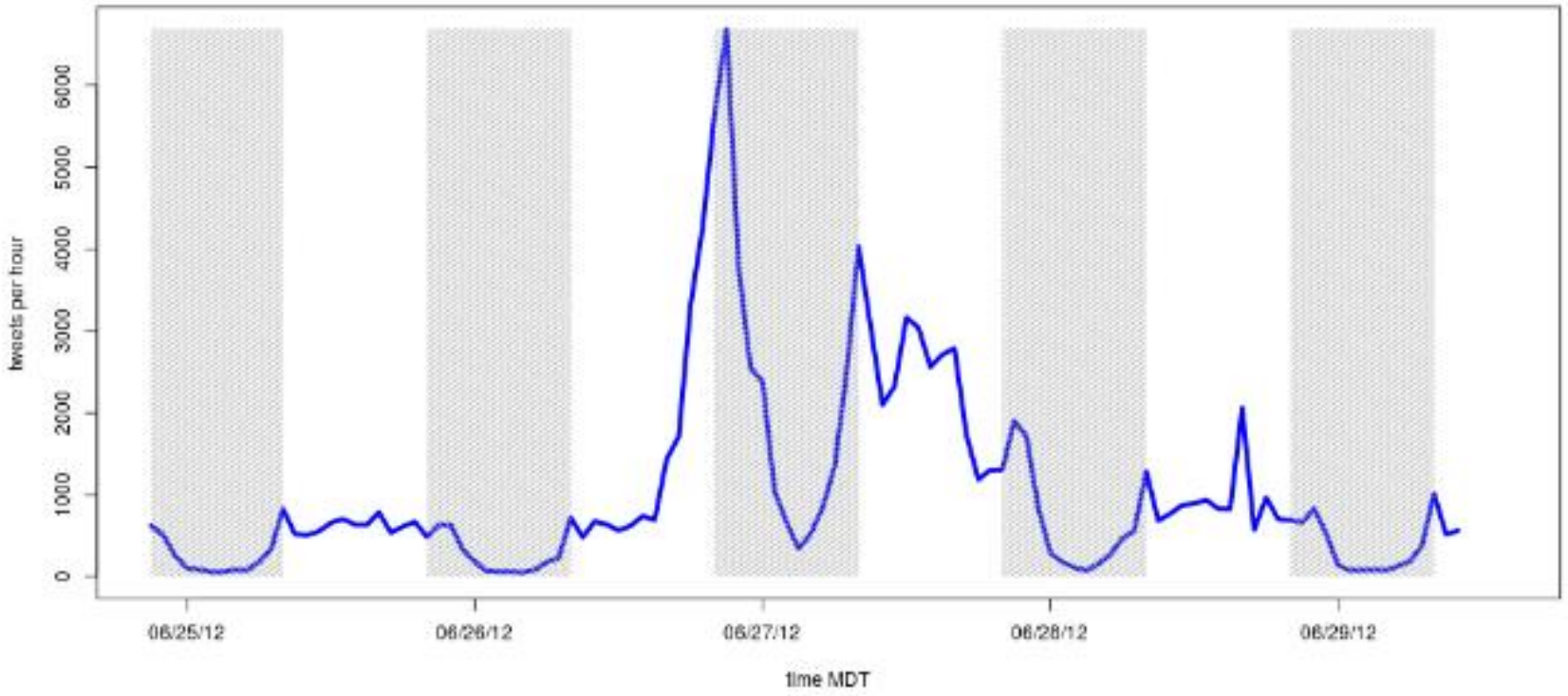
3 hours

Julian

evacuation route

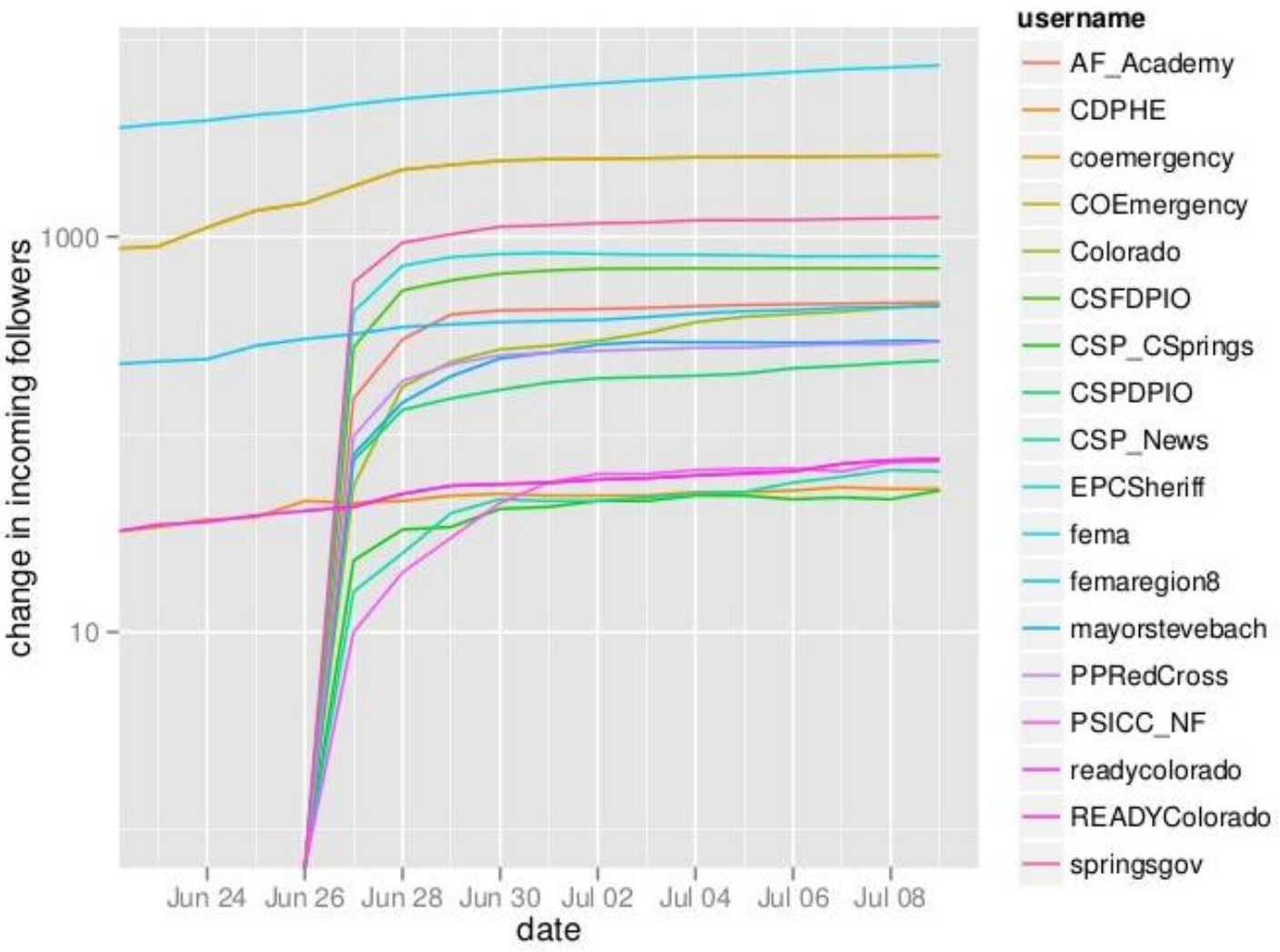
5 km

Social Media: Tweets in the Waldo Canyon Fire*



* Courtesy of Jeannette Sutton, The HEROIC Project, CU Colorado Springs

Twitter Followers: Waldo Canyon Fire



Social Media: Tweets from the 2012 Loveland Fire

(K. Klein, 2012, University of Utah)

Thanks!

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http://www.geog.utah.edu