

Warning and Response in the 2007 San Diego Wildfires

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Science Based Behavioral Studies Have Been Conducted on Warning Response In USA For Over 50 Years

- Hurricanes:
Elena, Kate, Eloise, Camille,
David, Frederick, Carla,
Floyd, Andrew, Bertha, Fran,
Georges, Brett, Bonnie, Ivan
- Hazardous Materials:
Mississauga, Mt. Vernon,
Denver, Confluence,
Pittsburg, Nanticoke, West
Helena, Graniteville
- Nuclear Power:
Three Mile Island
- Floods:
Denver, Rapid City, Big
Thompson, Abilene,
Clarksburg, Rochester,
Sumner, Valley, Snoqualmie,
Denver, Austin
- Volcano:
Mt. St. Helen
- Wildfire:
San Diego
- Tsunami:
Hilo

Factors Impacting Warning Response

- The message
- Cues
- Individual characteristics
- Roles
- Experience
- Belief
- Knowledge
- Perceived risk
- Social interaction




October 2007 Wildfires

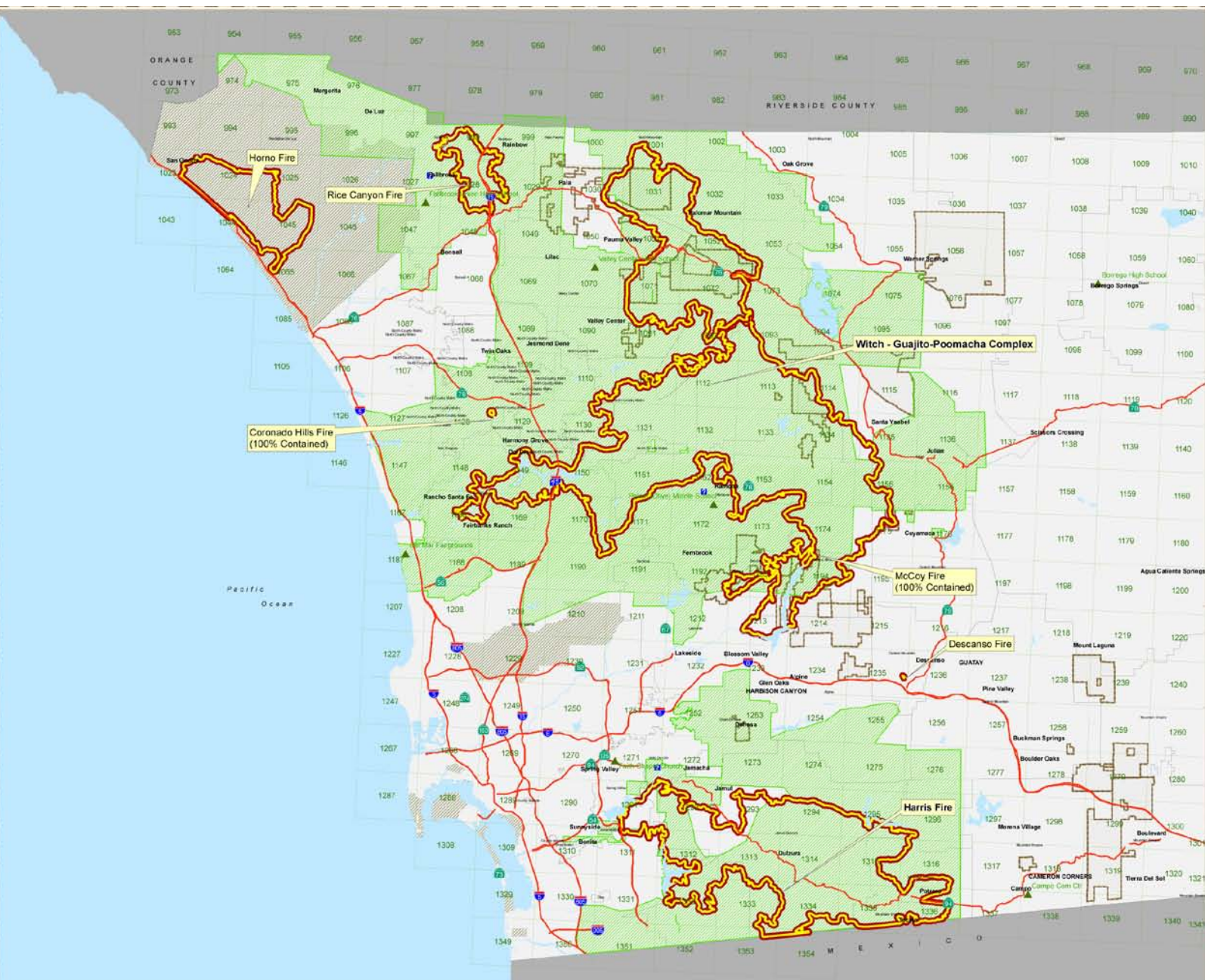
- Harris Fire - 9:23 am Oct. 21
- Witch Fire - 11:30 am Oct. 21
- Rice Canyon Fire – Oct. 22
- Poomacha Fire – Oct. 22
- Four other fires
- Fires end Nov. 9



San Diego County
0930 Hrs UPDATE
October 31, 2007

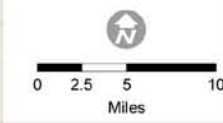
Perimeters from:
CAL Fire
MODIS Satellite Data
WebEOC information,
City of San Diego Fire.

-  Local Assistance Centers
-  Shelters
-  Freeways
-  Approx. Fire Perimeters
-  Approx. Re-Open Areas
-  Thomas Bros. Pages
-  Lakes



Data Source: Esri(1)

This map is provided as a service to the public and is not intended to be used for any purpose other than general information. It is not intended to be used for any purpose other than general information. It is not intended to be used for any purpose other than general information. It is not intended to be used for any purpose other than general information.



Map Updated: 10/31/07
Map Prepared by: [unreadable]



Estimated Fire Damage

- 368 thousand acres burned
- 1,600 homes destroyed
- 1,000 other structures
- 239 vehicles
- 10 civilian fatalities
- Numerous injuries
- \$1.5 billion damages



Evacuation

- Estimated that over 500,000 evacuated
- Survey - 59% evacuated
- Reasons for not evacuating
 - Residence not threatened – 55%
 - Not told to evacuate – 36%
 - Stayed to protect property – 8.2 %
 - Stayed to protect animals - 4%
 - Could not leave – 2%



San Diego Reverse 911

- October, 2007, wildfires in San Diego City and County
- County extensively used reverse 911 for evacuation notifications
- Opportunity to assess the effectiveness of phone messages
- Did not evaluate call completion rate
- Conducted survey of 1200 households in evacuation zones

Methods of Warning

- Reverse 911
- Route alert
- Media
- IP system
- Weather radio
- Hotlines (211)
- Road signs



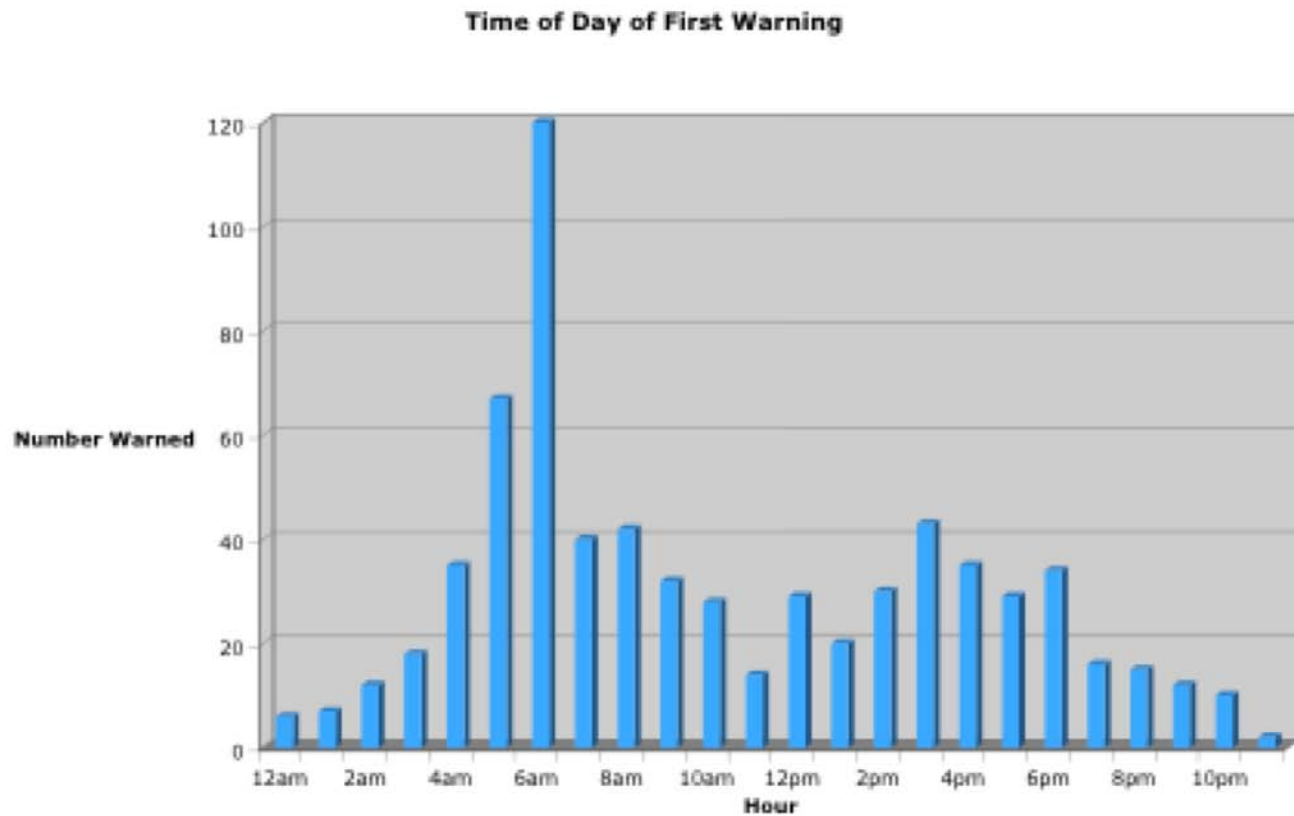
Reverse 911 Use

- Targeted to specific areas/subdivisions
- County: 233,950 evacuation calls
 - Activated 36 times
- City: 14,738 evacuation calls
- Short 15 second message
- Some mandatory, some advisories
- Also supported reentry and health warnings after evacuations

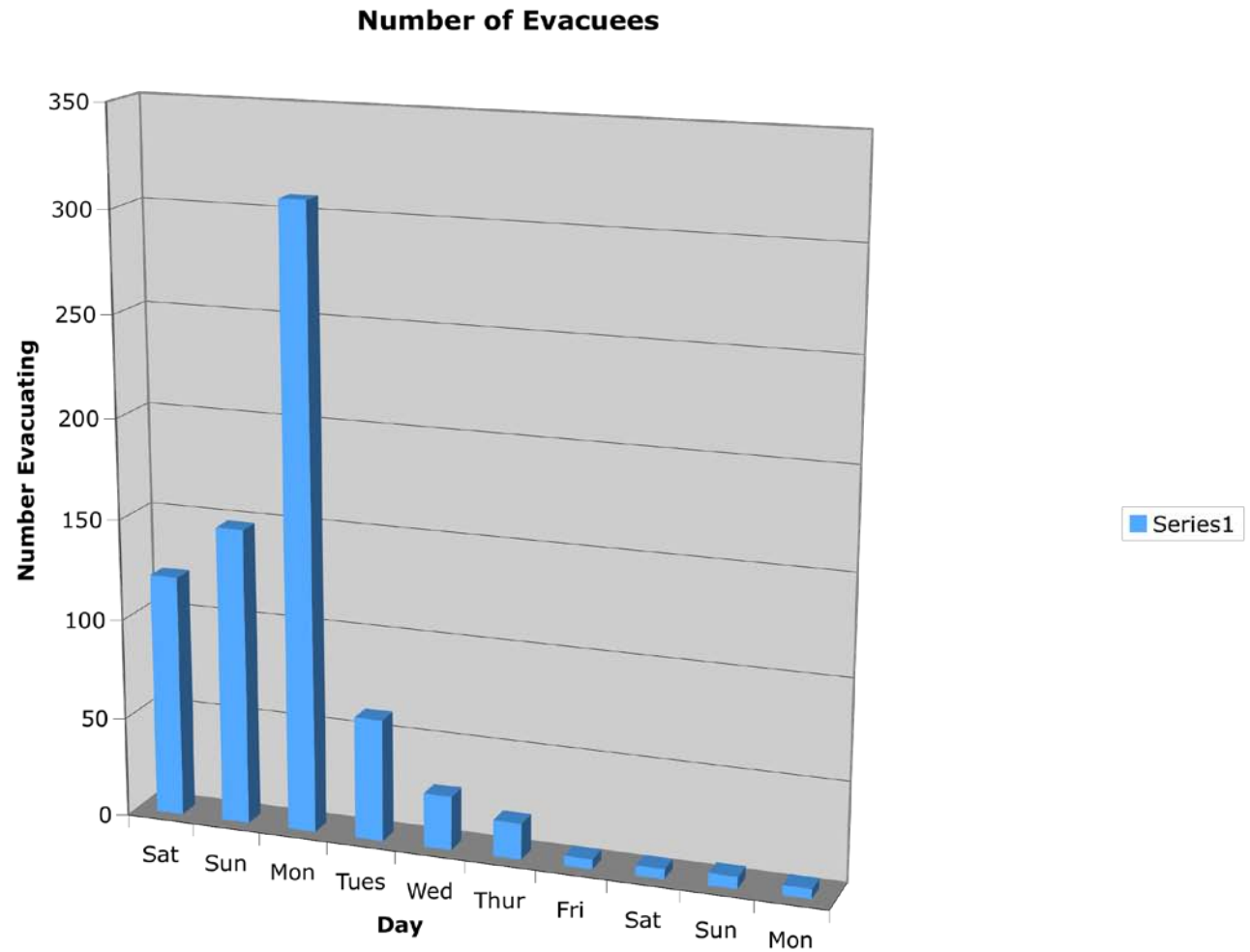
Source of First Warning

- Reverse 911 – 42.1%
- Television – 7.7%
- Route alert – 4.1%
- Informal face-to-face – 3.8 %
- Informal telephone call – 2.4%
- Tone alert radio – 0.3%
- IP device – 0.2 %
- Radio – 0.2%

Time of Day of Warning



Date of Evacuation



Evacuation Destinations

Destination	Frequency	Percent
Relative's home	312	43.6
Friend's home	197	27.6
Public shelter	35	4.9
Hotel or motel	79	11.0
Other	92	7.6
Total	715	100

Problems During Evacuations

Problem	Frequency	Percent of evacuees
Debris on roads	16	3.2
Road closures	33	6.6
Health effects	3	0.6
Smoke interfering with vision	43	8.6
Traffic congestion	201	40.6
Vehicle problems	4	0.8
Other	10	2.0

Factors Explaining Evacuation

- Receipt of reverse 911 call
- Perception that residence was in an area threatened by wildfires
- Adoption of mitigation measures
- Receipt of informal warning
- Lived in a rural area
- Saw smoke or fire (environmental cues)

Conclusions

- Evacuation viewed by officials to be successful
- New technologies offer rapid forms of evacuation warning
- Reverse 911 was effective in getting people to evacuate
 - Personal message
 - From authoritative source
 - People confirmed message