

Community-Based Planning for Disaster Preparedness:

A Case Study after the East Bay Hills Firestorm, California

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Abstract:

Recent disasters have increased awareness of the importance and need for adequate disaster preparedness and recovery. Post-disaster recovery research has primarily focused on the rebuilding of individual households and businesses or infrastructure. However, the intermediate layer of neighborhoods and the roles they serve in the recovery and the preparedness processes are often overlooked. This study evaluates the emergency preparedness of East Bay (East Bay of the San Francisco Bay Area) neighborhoods through an analysis of responses and improvements after the 1991 East Bay fire.

This paper briefly explains what has happened after the East Bay fire and discusses how people and neighborhoods—such as the North Hills Phoenix Association (NHPA), established soon after the 1991 fire—have been involved in disaster preparedness and emergency response. Their roles and activities have shifted over time, from post-disaster reconstruction of neighborhoods to improvements to neighborhood planning, landscape, and safety. Other proactive community-based groups and activities include CORE (Citizens of Oakland Respond to Emergencies) in the City of Oakland and CERT (Community Emergency Response Team) in the City of Berkeley.

It is clear that both cities are becoming very proactive in preparation for future disasters, and many residents and neighborhoods participate in trainings and exercises offered by the programs. These continuing efforts in community-based disaster preparedness are necessary in order to reduce future chances of disaster or, should one occur, mitigate the effects and improve recovery.

Keywords:

*Community-based Disaster Preparedness, Neighborhood Association, Networking,
East Bay Fire in 1991, Oakland and Berkeley, California*

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1. Introduction

Recent occurrences of large disasters, both natural and man-made, have focused attention on the importance and need for disaster preparedness. The United States government, after Hurricane Katrina, recognized the need to create a culture of preparedness that emphasizes shared responsibilities with citizens and disaster preparedness at all levels of governmental agencies and citizens/communities.¹⁾ Mileti proposed the concept of “sustainable hazard mitigation” and listed its six important components: (1) sustain and improve the quality of the environment, (2) sustain and improve the quality of life, (3) improve the coping capacity and responsibility of the local population against disaster, (4) sustain local economic activities, (5) ensure fairness among generations and between generations, and (6) ensure that the local population is involved and build consensus.²⁾ Most local authorities formulated their master plans by considering all of these components. In disaster management, these components are also important in planning for sustainability and accordant activities and budgets. Also, organizational structures help to create linkages between local resources and to further the understanding of local needs to be considered in risk reduction and recovery.³⁾

Despite this recent awareness, Pearce found that, historically, disaster management planning in North America has been viewed from a paramilitary perspective.⁴⁾ Rubin also observed that community members have become increasingly frustrated by being excluded from disaster planning and involvement in those activities.⁵⁾ Fortunately, public participation in general is now becoming more accepted as a part of disaster management processes.

The San Francisco Bay Area (Bay Area) is known for its historical and beautiful urban settings, and it attracts a large population and forms a core community in North America. The Bay Area is also prone to different hazards such as earthquakes, wildfires, landslides, and liquefaction. After two major disasters in this area, the 1989 Loma Prieta earthquake and the 1991 East Bay fires, residents increasingly recognized the importance of disaster awareness and community preparedness. However, it has been over 20 years since these large-scale disasters devastated the area. The residents in general are aware that much of the population resides in a disaster-prone region, as there are significant earthquake faults across the region and wildfires may easily start at the multiple wildland-urban interfaces in Bay Area neighborhoods. However, in practice it is difficult to divert tax revenue from competing needs so it can be spent on preventive and preparedness measures. It can be also pointed out that the threats to community awareness by new residence who have not lived through prior disasters and who may underestimate the importance of preparation and or fail to obey evacuation orders.

This study focuses on research questions that evaluate the emergency preparedness of East Bay neighborhoods through an analysis of their responses and improvements after the 1991 East Bay fire. A discussion of activities since the 1991 fire is presented. This includes how organizations, including the local authorities, fire departments, and other related organizations, recognized the problem and established networks. The study also examines the involvement of the population and neighborhoods in disaster preparedness and emergency response.

1.2 Method

This study was conducted based on a literature review of existing books, documents, and newspaper articles, as well as a website search, to collect data regarding the 1991 fire and subsequent community planning. One source is the neighborhood-based North Hills Phoenix Association (NHPA), which began issuing a newsletter three months after the 1991 fire that continues

to this day. To date, there have been a total of 73 issues comprising 497 pages. In addition, several interviews were conducted with the Oakland Fire Prevention Bureau (2), a former president of neighborhood association (1), an architect of neighborhood planning (1), a leader of a community-based group (1), and CORE program participants (3). The interviews were conducted from June 2013 to July 2014.

1.3 Study Area and the Disaster

The San Francisco Bay Area consists of the metropolitan areas of San Francisco, Oakland, and San Jose, along with major cities and smaller urban and rural areas. The Bay Area, covering 4.39 million acres, is composed of 101 municipalities, nine counties, and semi-independent districts. The nine counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma) provide public health, courts, and social support services above the municipal level.⁶⁾ The population is approximately 7.15 million.⁷⁾ The area is not only a famous tourist destination and a leading financial and cultural center (San Francisco), but also includes a major U.S. port (located in Oakland), the technology center of Silicon Valley in the San Jose area, and the famous academic institutions of the University of California, Berkeley, in the East Bay and Stanford University on the Peninsula south of San Francisco.

The Bay Area has experienced several natural disasters in the past. Due to its geographic setting, both the San Andreas and Hayward faults are responsible for earthquake activities. Since 1900, the Bay Area has experienced eight major earthquakes. Two of the largest were the Great San Francisco Earthquake (M 7.8)

Table-1 Number of Newsletters Issued by NHPA

Year	Issues	Pages	Year	Issues	Pages
1992	7	53	2004	4	24
1993	5	35	2005	4	24
1994	4	28	2006	4	30
1995	4	28	2007	4	30
1996	2	14	2008	4	30
1997	3	14	2009	3	21
1998	3	17	2010	1	7
1999	2	15	2011	2	14
2000	3	21	2012	2	10
2001	3	17	2013	0	0
2002	4	30	2014	1	7
2003	4	28	Total	73	497



Figure-1 Earthquake possibilities
Source: USGS 2007

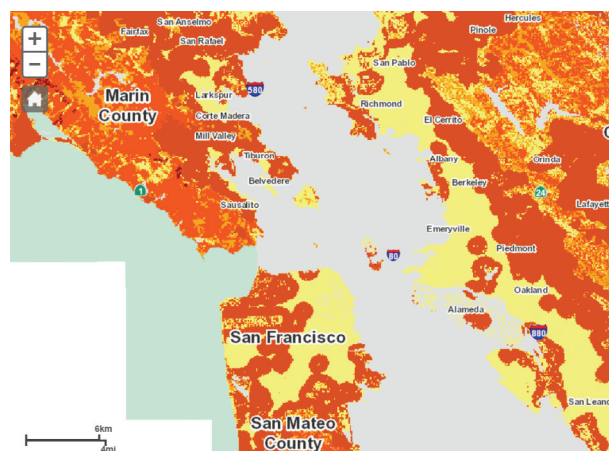


Figure-2 Study Area and Area of Fire
Source: earthquake and hazards program by ABAG

in 1906 and, more recently, the Loma Prieta earthquake (M 7.1) in 1989. Figure 1 shows the earthquake probabilities in the Bay Area.

The East Bay (Oakland and Berkeley areas) have historically been affected by fire. The East Bay is affected by “Diablo winds,” which are hot, dry winds that blow in the summer. The area suffered from major fires in 1923, 1970, and 1991. Large fires seem to occur historically every 10 to 20 years. However, recent residents either did not know or did not pay attention to one of worst fires in the area, which occurred in 1923 and devastated the hills.

After that fire, several studies were conducted to examine the issues and make recommendations; however, many important improvements to the fire safety of the area remained unaddressed and unsolved. For example, the entire area includes multiple wildland-urban interfaces, which are defined as an area where an urban, developed residential area is adjacent or near undeveloped lands prone to wildfire. Despite the risks, homes were rebuilt and the community recovered. Figure 2 shows the wildland-urban interfaces and potential fire risk in the Bay Area.

Based on these conditions, the East Bay continues to be prone to disaster and must prepare for possible future disasters.

2. 1991 East Bay Fire Lessons

Several books and reports have been published related to the experiences, details of fire department operations, and the issues and problems of the existing environment during the 1991 fire. However, investigations into the process of recovery and the reconstruction of community efforts have been limited. Attention paid to community-based disaster management (CBDM) has grown recently due to the increase in the number of natural disasters occurring worldwide and the number of case studies reviewing such disasters.

The devastation caused by the 1989 Loma Prieta earthquake and the 1991 East Bay Fire signaled a need to address a number of disaster resiliency issues. The experiences of these two disasters demonstrated the limitations of local government and fire departments. As a result, the Cities of Oakland and Berkeley have started to build up resiliency into the part of local government operations, their neighborhoods, and their citizens.

According to Topping, the City of Berkeley has integrating mitigation and preparedness into City policy. Berkeley’s resiliency approach has three major components: (1) recognition of risk reduction as part of local government’s work, (2) strengthening of public buildings and assistance to private owners to do the same, and (3) involvement of the community in preparedness efforts, working in tandem with the City.⁸⁾

2.1 Outline of the East Bay Fire

On the morning of October 20, 1991, a devastating fire occurred in the Oakland and Berkeley hills. The fire, occurring at a major wildland-urban interface, resulted in 25 deaths and 150 injuries, and destroyed about 3,354 single-family houses and 456 apartment units. It was estimated to have caused \$1.5 billion in damage.⁹⁾ This was one of the worst fires in California history, and at that time was the third most costly urban fire disaster in U.S. history after the San Francisco earthquake of 1906 and the Chicago fire of 1871. Although the area burned (about 647 ha) was modest compared with these other major fires, it was by far the most destructive wildland-urban interface fire in terms of damage to buildings.¹⁰⁾ Figure 3 shows the study area and fire affected/burned area in 1991.

A direct cause of the fire was the strong wind that rekindled a grass fire from the previous day. Many additional conditions are considered as contributing causes of the fire. Some of major causes discussed in reports and newspapers include, for example: (1) the five-year drought; (2) high temperatures with low humidity and a strong Diablo wind on that day; (3) the highly combustible eucalyptus and Monterey pine trees planted in



Figure-3 Study Area and Area of Fire
Source: Based on USGS, Park District

that area; (4) untreated wood shingles used as roofing and siding materials for homes, and wood decks extending out from houses on the hills; (5) narrow winding roads which limited access for the fire trucks; (6) an inadequate water hydrant system and power cuts to the pumping stations; and (7) an inappropriate response of the fire department.

2.2 The Importance of Regional Cooperation

The East Bay fire and the Loma Prieta earthquake brought to light the vulnerability of urban cities and the need for pre-disaster planning and cooperation. To address these problems, governmental agencies have established region-wide hazard management agencies/consortiums and committees that include citizens, representatives of neighborhood organizations, university professionals, and planners. James K. Mitchell wrote, “each displayed the advantages of possessing a well-organized ‘larger community,’ extending from the President of the United States to the professional staff of regional agencies, to whom private citizens and local city officials look for help in an emergency.”¹¹⁾ Mitchell also mentioned that the megacities are too large but individual cities are too small to serve as the responsible group for disaster planning, response, and recovery. Therefore, those megacities need to be divided into smaller areas that have the functional requirements for necessary services. Many different organizations and institutions are placed in cities and sub-regions responsible for specific purposes in the area. Within those organizations, there are high degrees of interaction. Regional agencies, such as the Association of Bay Area Governments (ABAG), the San Francisco Bay Conservation and Development Commission (BCDC), and disaster-related commissions, have evolved to support the cooperation of local governments within a form of vertical integration to provide a unified voice on issues. Given this context, it appears that cities have decided to advance to the broader aims of adaptation and resiliency.¹²⁾ Their efforts, which emphasize a bottoms-up approach supported by higher levels of government, have shaped the ABAG regional resiliency plan.¹³⁾ California has had a strong tradition of mutual help and intergovernmental cooperation long before the Loma Prieta earthquake, and this appears in its flexible and strong institutions of regional governance.

3. Community-Based Groups for Fire Reconstruction and Disaster Preparedness

3.1 Community Participation in Disaster Planning

Emphasis must be placed on individuals, neighborhoods, and community-based organizations that might be capable of providing the first response at the time of the disaster as well as the post-disaster response. Simpson discussed the reasons why neighborhood groups and community-based organizations should be the focus of the initial response:¹⁴⁾ (1) local organizations are capable of communicating with residents who might not be fluent in English; (2) neighborhood groups are more likely to know about local residents who need assistance and to assist in the evacuation of these residents; also, local residents will have knowledge of the geography, location of tools, and personnel that can be useful during an emergency; (3) local residents are onsite and, with appropriate training, they can act effectively as first responders.

3.2 The North Hills Phoenix Association

The North Hills Phoenix Association (NHPA) was established soon after the fire by some members in the same neighborhood who felt the need to get together, share information, and reach their local government. The geographic area encompassed by the NHPA includes the north Oakland Hills and a part of Berkeley adjacent to the Oakland boundary. This area includes about 1,500 households. The NHPA was established for the purposes of (1) advocating with the Cities and other governmental bodies, (2) collecting and sharing information related to rebuilding, and (3) creating a safe and ecologically healthy environment in the North Hills. During the rebuilding and reconstruction stage, NHPA contributed by organizing the disaster victims; gathering and sharing information by organizing public hearings; inviting guest speakers from local governments, fire departments, and insurance companies; and submitting suggestions and requests to the government. Their greatest contributions included successfully leading efforts to place utilities underground, insuring citizen involvement and input into the City's redevelopment planning, organizing and chairing many public meetings, and helping draft legislation to establish a special assessment district for fire prevention and suppression. The focus and activities of the association have changed over time, but it continues to meet regularly and support its community.

This association's roles and activities have shifted over time from a focus on the post-disaster reconstruction of the neighborhood to an emphasis on improving neighborhood planning, landscape, and safety. The present investigation followed this shift by examining the headlines of NHPA newsletters from all previous volumes and issues. The topics were divided into five-year periods from 1992 to 2014.

As Table 2 shows, in the first five years after the fire, the major topics were related to rebuilding the houses and neighborhoods. Among many, the following issues were the most reported and received the most attention: (1) leading the fight for the undergrounding of utilities; (2) explaining the establishment of the NHPA, their activities, and the benefits of joining the group; (3) representing homeowners in hearings with the Insurance Commissioner; (4) performing a prominent role in the ongoing formulation of new zoning (traffic control included) and preservation regulations; (5) ensuring that foundation removals proceed as mandated and working on projects related to building codes, parking restrictions, and Internet installation; and (6) planning and hosting emergency preparedness-related activities and ensuring the City's commitment to build the North Oakland Hills Fire Station. In addition, their activities included citizen involvement and input into the City's redevelopment planning, lobbying on both the federal and

state level for tax relief, and providing input for improved vegetation management.

Six to 10 years after the fire, NHPA's activities continued in rebuilding but also began to address new issues. Major issues during this period were: (1) ensuring the City's commitment to proceeding with several projects, such as repaving, construction of the new fire station, vegetation management, etc.; (2) working on drainage management, preparing landslide/erosion lists, and presenting information to City offices for appropriate action; and (3) ensuring that new development meets development criteria. Also, the NHPA organized community gatherings such as potluck parties to welcome new neighbors and strengthen community ties.

After 11 to 15 years, many of the suggested ideas were realized. There are now established communication networks through a website (Open forum) and the Phoenix Emergency Notification System (PENS) (neighborhood radio network). A wildfire prevention district mitigates potential fire hazards.

In 2010, NHPA changed its name to the North Hills Community Association (NHCA), and its bylaws were updated to meet current conditions and needs. Most recently (16 to 23 years after the fire), the NHPA has focused on creating a neighborhood watch group, joining Oakland's neighborhood crime prevention council, and encouraging citizens to participate in the Citizens of Oakland Respond to Emergencies (CORE) program (which includes community-based disaster preparedness lectures and exercises). Also, by this time much of the neighborhood has changed. The new generation of residents lacks experience with the 1991 fire; therefore, the association is encouraging residents and new neighbors to participate in the NHPA.

Table-2 Issues raised in every five-year period in the NHPA newsletter

Headline/ Topics	First 5 years	6-10 years	11-15 years	16-22 years	Total
Undergrounding utility	12	0	0	0	12
Explanation of NHPA	8	0	0	2	10
Insurance	8	6	1	0	15
Parking restriction	5	0	6	1	12
Foundation removal	5	0	0	0	5
New fire station on the hill	5	5	0	0	10
Landslide	3	5	4	0	12
Drainage	0	5	1	10	16
Development	1	5	2	0	8
Open forum	0	0	10	3	13
PENS	0	0	8	5	13
Trail	0	1	7	0	8
4 th Bore tunnel	0	1	6	7	14
Wildfire prevention district	0	0	7	7	14
Crime prevention	0	1	2	10	13
Neighborhood group	1	2	0	5	8
CORE	2	1	4	4	11

From 1992 to 2008, the NHPA's focus has shifted from reconstruction to disaster preparedness and the improvement of the living environment in general. In addition, much effort was devoted to publicity and organizational management in 2008, as many new neighbors did not know about the 1991 fire and NHPA; thus, the NHPA needed to involve new people and raise funding to ensure the sustainability of the organization and its activities.

As listed above, the association's achievements range from neighborhood social events to working with the City to establish programs. The NHPA takes a lead role in organizing community

members to achieve their goals. Through different activities over the years, NHPA has accomplished the following: (1) networking residents and City government officials, (2) accumulating knowledge and experience in several subjects as well as human resources, and (3) establishing a co-working and trust-based relationship with the City and other governmental and non-governmental organizations.

There is a rationale that emphasis needs to be placed on individuals, neighborhoods, and community-based organizations that might be capable of providing the first response at the time of a disaster and during post-disaster rebuilding. Their voluntary spirit to improve their neighborhoods deserves the most consideration. Neighborhood groups are more likely to know about local residents who need assistance and are able to assist at the time of disaster as well as ordinary times. Also, they are more aware and knowledgeable of geographical considerations, problem locations, or personnel who are knowledgeable of relevant subjects. Continuing efforts are necessary in order to reduce the risks of disasters in the future. Neighborhood groups play a key role in networking and informing residents in urban settings to remind them of the disaster risks in their living environment.

Further study is needed to understand the management practices of these organizations and the human resources needed to sustain neighborhood groups. Figure 4 shows the timeline of NHPA development and the major issues over the course of this development. Figure 5 shows the newsletter and website of the North Hills Phoenix Association.

Oct.1991	1996 (5 yrs)	2001 (10 yrs)	2010 (15 yrs)	2014 (present)
1991 Fire	Rebuilding	Re-Establishing Community	Community enhancement	
<div>NHPA established</div> <ul style="list-style-type: none"> - Undergrounding Utility - Foundation removal - Design review - Zoning - Insurance - Vegetation Management 				<div>Renamed NHCA</div>
		<ul style="list-style-type: none"> - New development - Landslide - Drainage - Community gathering - Community Policing - Fire prevention - Disaster Preparedness - Communication utility 	<ul style="list-style-type: none"> - Crime prevention - Tunnel development - Creek protection - Trail - Drainage - Illegal Parking 	

Figure-4 Development of NHPA and major issues



Figure-5 Newsletter and Website by North Hills Phoenix Association

3.3 Citizen Engagement in Disaster Preparedness

Disaster preparation requires community-level engagement and community support. The Cities of Oakland and Berkeley have established a community training program operated by the Oakland Fire Department. Community-based group activities within CORE in Oakland and CERT (Community Emergency Response Team) in Berkeley began in 1990 and 2002, respectively. Their original effort was designed to train neighborhood individuals and disaster-related City departments after the 1989 Loma Prieta earthquake. Many residents were motivated to participate in the emergency preparedness activities after the fire. CORE has had a positive influence in the neighborhood and the City of Oakland.

The purpose of CORE's exercises is to provide an opportunity for trained volunteers to practice disaster response activities and to enhance the skills associated with operating a neighborhood-level disaster response organization. Participants who are not CORE-trained have the opportunity to become more familiar with disaster preparedness principles. CORE is built on the idea that organized neighborhoods can support themselves when first responders are overwhelmed after a major emergency or disaster event. The training is free and a response training program from the Oakland Fire Department, Office of Emergency Services is provided for Oakland residents. For example, CORE training educates people about disaster preparedness initiatives that are germane to hazards that may impact their area, and teaches them basic response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations.

Within Berkeley, when a neighborhood group completes the training, it receives a cache of equipment (generators, hoses, first aid, power saws, etc.) to keep within the neighborhood at a location of its own choosing. In both programs, refresher courses are offered to keep groups involved and to build networks between neighborhoods.

In Oakland, more than 18,000 residents have been trained since 1990.¹⁵⁾ In Berkeley, in 2010, 46 groups became trained and received caches. Over 1,400 citizens have been trained and are now networked. These groups are a source of social capital and are likely to be the first responders at a scene following a disaster.¹⁶⁾ Through lectures and demonstration, CORE instructors actively engage citizens with informative and interactive training to develop self-reliance skills and neighborhood organization skills. CORE training is divided into three levels, and the outline of each is provided below.

- CORE I - Home and family emergency preparedness: learn about reducing common household hazards, create a family emergency plan, prepare emergency supply kits, and develop evacuation plans.
- CORE II - Neighborhood preparedness and response teams: learn to organize a neighborhood emergency response system, set up a neighborhood command center, and learn basic community organizing principles to involve neighbors.
- CORE III - Emergency response hands-on training: Learn beginning response tactics and sizing up an emergency situation. Learn basic concepts and hands-on skills in basic fire suppression, damage assessment, light search and rescue, disaster first aid, assisting people with special needs, and disaster psychology.

CORE I and CORE II are taught by CORE instructors at neighborhood sites such as private homes, libraries, churches, or schools. These trainings require a minimum of 15–25 participants. For CORE III, classroom instruction, hands-on training, and practice exercises are conducted by firefighters at

the Oakland Fire Training Center. When citizens complete CORE I, II, and III, they receive a graduation certificate, CORE hat and vest with CORE photo ID, and they become registered as a Disaster Service Worker.

CORE is highly recognized by the City of Oakland and other organizations. In 2004, the Oakland City Council gave an award to CORE as an outstanding service to the Oakland community, and the Fireman's Fund Insurance Company recognized it for its contribution to Making Oakland Safe.

In addition, the City of Oakland conducts citywide emergency exercises every April. The participating neighborhoods are spread throughout the City with the highest participation in the 1991 fire-affected areas. The participants and participating neighborhoods are positive about the results. Each city and community is different and has different needs; thus, the programs offered by each city meets those needs.

It is clear that Oakland is taking very proactive actions before the next disaster and many residents and neighborhoods are keeping up with trainings and exercises offered by CORE. CERT program in Berkeley also provide similar trainings to increase awareness of residents and neighborhoods.

4.1 Conclusion

Rationale is provided for a needed emphasis on individuals, neighborhoods, and community-based organizations that might be capable of providing the first response at the time of a disaster as well as post-disaster response. Neighborhood groups have the advantages of knowing local residents and their special conditions and needs in event they must evacuation to escape danger. Also, local residents are often knowledgeable about their geographic locations and are able to notice changes and dangers occurring in their living environment.

Many residents were motivated to participate in emergency preparedness activities after the Loma Prieta earthquake of 1989, and this was amplified by the East Bay fire in 1991.¹⁷⁾ This case study demonstrates the possibility of integrating resilience in many ways, including neighborhood groups to share in the responsibility for disaster preparedness and reconstruction.

Also, community-based efforts like CORE or CERT are having a very positive influence over neighborhoods and in the Cities of Oakland and Berkeley. It is clear that these cities are taking very proactive steps before the next disaster, and many residents and neighborhoods are keeping up with trainings and exercises offered by these programs.

As time passes on, with the fading of memories of Loma Prieta and the 1991 firestorm, the sense of urgency for emergency preparedness fades and some residents lose interest.¹⁸⁾ As recently as 2013, 66.3% of residents in the Oakland hills voted for a renewal of funding for the Wildfire Prevention Assessment District (WPAD), but this was just shy of the two-thirds majority needed for passage and the measure failed.¹⁸⁾

Continuing efforts with emergency organizations are necessary in order to reduce the chances of disaster and mitigate the ensuing damage that will inevitably arise in the future. Neighborhoods need to be continuously involved to maintain awareness and to prepare for the worst scenarios. The Bay Area has been tested and many have suffered by the fire in 1991, especially in the East Bay. Coping with this event brought together different specialties among multiple agencies and cities/regions in order to prepare for future disasters.

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