California's Emergency Response to a Major Earthquake

A Report of the
Urban Search and Rescue Emergency Advisory Committee on the State's
Readiness and Resource Needs

California Seismic Safety Commission
1755 Creekside Oaks Drive, Suite 100
Sacramento, California 95833

Commission Publication No. 06-03
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Dedication

Raymond M. Downey, a Deputy Chief for the Fire Department of the City of New York is recognized as the "Father" of modern Urban Search and Rescue techniques.

In March 1998, Chief Downey testified before Congress about the first attack on the World Trade Center. Requesting additional funding for Urban Search and Rescue, at that hearing he said

> *…We, the fire service, are no better prepared then we were back in 1995. Why? The training that has been given with federal funding is not being directed to the "first responder," and the lack of providing funding for the necessary equipment for these responders is directly related to the lack of our preparedness.*
>
> *…The first responders, the firefighters...performed heroic actions only because they were able to be on the scene within minutes and were properly trained and equipped.*

Chief Downey died in the September 11, 2001 attacks on the World Trade Center.

The Urban Search and Rescue Emergency Advisory Committee of the California Seismic Safety Commission proudly dedicates this 2006 report in honor and in the memory of Deputy Chief Ray Downey.

Executive Summary

After revisiting the issues and recommendations presented in the original 2003 Report, participating and evaluating emergency responses to local mudslides, flooding, mass transportation accidents, the 2004 Southeast Asia Tsunami and 2005 Gulf Coast Hurricanes, the Urban Search and Rescue Emergency Advisory Committee of the Seismic Safety Commission now finds and recommends:

1. The recommendations presented in the original 2003 edition of the Committee's Report to the Seismic Safety Commission remain valid and should be expeditiously implemented. Those recommendations are re-published below.

2. The State must actively support California's emergency response to earthquakes and other major disasters by enhancing specialized resources from local and/or State/National US&R Teams, Hazardous Material Response Teams, Swiftwater/Flood Search and Rescue Teams and Wilderness Search and Rescue Teams.

3. The State should immediately and aggressively pursue funding from federal, state and other public or private sources to finance the acquisition of vehicles and equipment, the construction and improvement of training facilities, and the expansion of specialized training.

4. The State should direct the Office of Emergency Services, in consultation with the California Seismic Safety Commission and the State Fire Marshal, to develop a detailed, multi-year master plan and timeline for the acquisition of the vehicles and equipment, the construction and rehabilitation of facilities and the expansion of specialized training for the improvement of local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue resources.

5. Communications infrastructure continues to be a problem for the State's emergency response. Full-range radio interoperability needs to be recognized as a high priority and funded accordingly. A temporary stopgap emergency communication capability for use at the local level must be identified and provided until adequate funding is obtained to mitigate the State's more comprehensive communications challenges.

6. An estimated $284 million is currently needed to support and enhance the existing state and local US&R and specialized emergency response resources. An additional $9.5 million is needed on an annual basis for ongoing training of specialized emergency response personnel.

In the original 2003 Report, the Committee's findings included:

- It is imperative for public health and safety that trained and equipped local US&R first-responders are available for emergency response throughout the state;

- Local and State US&R teams are vulnerable to local-area disasters (such as earthquakes) and could be compromised in their capabilities to deliver prompt life-saving services;
- Local governments alone cannot shoulder the financial burden of developing and maintaining the needs of local US&R teams;
- The benefits of well-maintained and equipped local US&R teams extend to regional and State jurisdictions;
- Emergency response equipment being utilized by many local agencies is aging and less effective than newer equipment; and
- Emerging technological advances are continuing to develop emergency response equipment that is more effective and efficient, yet costly to local jurisdictions.

In the 2003 Report, the Committee recommended:

- Active and expanded support for the improvement and expansion of local US&R teams;
- Immediate and aggressive pursuit of funding from federal, state and other public or private sources to finance the acquisition of vehicles and equipment, the construction and improvement of training facilities, and the expansion of specialized training;
- Development of a detailed, multi-year master plan and timeline for the acquisition of the vehicles and equipment, the construction and improvement of training facilities, and the expansion of specialized training; and
- Establishment of an US&R Oversight Committee to supervise the State's efforts to carry out these recommendations in a timely, cost-effective and expedited manner.

California Seismic Safety Commission

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Purpose of Report

The original edition of this Report was prepared to comply with Chapter 460, Statutes of 2002 (AB 2002, Alquist). That legislation (codified as Section 8601 of the California Government Code) directed the Seismic Safety Commission to convene an **Urban Search and Rescue Emergency Advisory Committee** to prepare a strategy, plan and recommendations addressing the resource needs of emergency urban search and rescue teams (US&R) in California. The original report was submitted to the Governor and the Legislature on September 11, 2003, the 2nd Anniversary of the September 11 terrorist attacks on the United States.

The 2003 Report was developed in recognition of the role that US&R teams performed in response to the 2001 disasters in New York and Washington, DC, including the 1989 Loma Prieta Earthquake, 1994 Northridge Earthquake and the 1995 Alfred P. Murrah Federal Building Bombing in Oklahoma City.

In 2005, in the aftermath of the series of catastrophic hurricanes and storms that struck the Gulf Coast in the southeastern area of the United States, the Commission concluded that an update of the 2003 Report was warranted. As with the rescue efforts in the aftermath of the 2001 attacks, US&R teams again were deployed to the Gulf Coast in 2005 to assist in rescue and recovery.

This 2006 update of the Report is intended to capture the lessons learned from the experience of the California-based US&R teams and emergency response teams while deployed to:

- Gulf Coast hurricanes (2005)
- Mudslides in La Conchita (Ventura County, 2005) and San Bernardino County (2003)
- Floods in Napa County (2004 and 2005)
- San Simeon earthquake (2003)
- NASA Columbia Shuttle disaster (2003).

This update also reflects the modifications and supplements to the post-2003 equipment caches of the California-based US&R teams. Since 2003, several California communities received additional equipment for US&R, Hazardous Material, and Swiftwater/Flood Search and Rescue teams as well as funding for training under various federal Homeland Security grant programs.

Consequently, the equipment cache needs of the California-based US&R, Hazardous Material and Swiftwater/Flood Search and Rescue teams have changed since 2003. This report, then, describes the post-2003 changes in equipment and supplies. It also updates the status and resources of California's specialized emergency response resources and provides a description of the current resource needs of these vital and heroic response teams.

A Scenario: Earthquake in San Bernardino County

The earthquake scenario that follows was created by the Committee to illustrate the probable damage and critical response efforts subsequent to a major earthquake near a large urban area. The scenario is based on reputable seismological forecasts of a major earthquake striking Southern California communities.

Time: 0745 hours
Earthquake:

- Magnitude 8.1 extending from Parkfield to Bombay Beach (Imperial County)
- Intensity VII extends for more than 10,000 square miles
- City of San Bernardino reports shaking of MMI X.
- Strong shaking in San Bernardino lasts for 2+ minutes
- The fault offsets are observed to be 20-30 feet, breaking gas lines and water lines crossing the fault
- Several major freeways into the Los Angeles basin are reported to be offset.
- There is concern that aftershocks could be on other faults in the Los Angeles Basin.

In San Bernardino County--

07:46: *Immediately following the earthquake, Fire Department personnel begin attempts at moving equipment out of their respective apparatus bays. This proves to be difficult or impossible at many fire stations as damage to the stations ranges from little damage, to partial collapse, to total structural collapse. Many firefighters are injured or killed in the initial event and apparatus damage ranges from total-loss to minor. The San Bernardino County Emergency Operations Center is immediately activated and a call for staffing is put out through the County Communications Center, which begins operating on automatic emergency stand-by generator power. The Communications Center is inundated with 911 calls for help from cell phones, as landlines are not functioning. Dispatching of all available fire station crews begins in earnest and recall of off-duty fire and police personnel is attempted.*

Multiple requests are made for the county's urban search and rescue resources.

07:50 - *Fire department units attempt to access areas where they have been dispatched and locations of high probability of victim entrapment. They encounter roadways completely blocked by downed utility poles and wires, debris, rubble, and potions of collapsed structures including over-passes and bridges. Many roadways are offset by ground shifts of up to 20 feet or more. Other streets exhibit fissures of varying widths and depths. Many streets are flooded by ruptured water mains and fires are erupting at an alarming rate due to broken natural gas mains. Underground gasoline pipelines – the most notable of which passes through a residential neighborhood in North San Bernardino – have ruptured and are sending flaming high-pressure fuel 50feet into the air, igniting nearby structures. Ironically, this same gasoline pipeline ruptured in 1989 from impact caused by a derailed freight train. Local first responder units are attempting to triage buildings to identify where to best direct resources for rescue activities.*

08:00 – *Reports reach the County Communications Center that the Guthrie interchange (Interstates 10 and 215) in San Bernardino has completely collapsed. Many vehicles and their occupants are crushed. Other reports of a partial collapse of the I-10 and I-15 interchange near Fontana begin to come in. Fire crews realize that mutual aid will be very slow in coming. Fire fighting efforts are nearly futile due to the complete failure of the water distribution grid to fire hydrants. Several of San Bernardino's older high-rise structures downtown have completely collapsed and many others are severely damaged. The dam at big Bear Lake is reported to be exhibiting large cracks that are weeping water. Fire Department personnel are overwhelmed.*

09:00 – *Governor declares a state of emergency. All eight California State/NationaUS&R Task Forces are requested. At least four of the eight will have great difficulty traveling from their damaged home bases in Southern California to the disaster's hardest hit areas. Several more State/National Task Forces are activated in other states.*

In the City of Los Angeles--

At 0745 hours, most of the firefighters are just completing their morning inventory of the apparatus and their personnel protective equipment. Some are in the shower or attempting to get into their uniforms before the morning rush of EMS runs. The Captain is in the front office reviewing the scheduling and ensuring that the firefighters are all on the day's timesheets when the earthquake strikes.

The earth buckles and shakes for a full two minutes. The Fire Station is rocked, windows break and anything that was on a shelf or in a cupboard is sent hurling to the ground. The firefighters rush for cover as they have been taught, thus avoiding injuries from glass and falling objects. After the shaking stops, the Captain takes stock. The Captain examines the firefighters checking for injuries. They all proceed to inspect the station for stability and move to the apparatus. The apparatus has moved three feet from its original parking spot. They all see the destruction of the station and contemplate what they will find on the outside.

Power is out so they must open the apparatus doors manually. They get the doors open, climb on the fire engine and move out of the station. They close the doors behind themselves manually.

The Captain surveys the situation. The Captain sees severe damage to buildings; numerous fires starting in the first in district and dazed citizens are walking out of their houses. Some are covered with blood and many are crying. The Department radio is already busy with company damage reports.

The Captain takes the company to the designated safe area and checks in with the Battalion Chief. Through the radio check in, the Captain hears that most of the fire companies are operational. They begin their district drive-through --to gather information on the size and scope of the emergency. In the first hours after the earthquake, information is the most important asset and the fire companies are

responsible for getting it. The Captain avoids getting involved in any single incident until the drive-through is complete, passing burning buildings, collapsed structures, and injured citizens. The size and scope of the problem will not be obtained for many hours.

Numerous citizens try calling the fire department through the 911 system. The dispatchers quickly shift into a degraded dispatching mode and just log the incidents for transmittal to the field commanders. The field commanders will triage the calls and dispatch companies when they become available. Soon, the volume of calls jam the phone system and phones become useless for communication.

The Battalion Chief is in charge of seven fire stations. The radio check in found moderate to severe damage to all seven stations. The Chief realizes that his nine fire companies and six ambulances are all that the citizens in fifteen square miles have available. The Chief monitors the radio and begins his triage. Single-family homes collapsed or burning will be low priorities. Single injuries, no matter how severe will have to be ignored. Schools, hospitals and apartment buildings will be the highest priorities.

The ambulances must determine the status of the hospitals. The Chief directs the ambulances to the hospitals. Once there, the ambulances report that the hospitals have sustained major damage, are without power, and are saturated with patients from the neighborhood. The local medical system is closed. The park will be utilized for a causality collection location. The ambulances will be sent to the park to triage, and treat the injured. Convergent volunteers will be directed to the park to help with the injured. Makeshift tent cities will pop up in the park when citizens self evacuate. They will need food, water and medical supplies within the next few hours.

In Los Angeles County and surrounding counties --

Several major freeways near the LA basin are reported to be offset by 10–15 feet and more than 24 freeway overpasses have collapsed onto the I-10 and I-215 freeways. The Ontario and John Wayne Airport runways have been damaged and are not useable. Railroad tracks near the area have been displaced and are inoperable. Landslides are blocking most nearby foothill and mountain roads.

Two major dams in the San Gabriel Mountains built in the mid 1920's, north of the Los Angeles Basin, have failed and flooded nearby communities. There is a potential for massive casualties. Residual water is more than six feet deep in low-lying areas.

Due to inadequate and non-retrofitted construction, many buildings in the older communities have completely collapsed, potentially killing and trapping thousands of victims. Several schools, colleges, hospitals, large businesses, shopping mall, and retail centers have been severely damaged and partially collapsed entrapping hundreds of injured victims at each site. There is concern that aftershocks between magnitudes 6.5 - 7 will be even more damaging to buildings already weakened by the main shock.

Fires have ignited and are spreading throughout most communities due to ruptured natural gas lines and failed water delivery systems. One petrochemical refinery is on fire and multiple industrial warehouses in East Los Angeles County are damaged and leaking chemicals, forming large vapor clouds.

Most Fire Department and Police Department facilities in the affected area have been damaged. The damage is so severe that public safety facilities have partially collapsed onto fire and police vehicles and equipment. Multiple injuries to public safety personnel are reported. The Fire Department response is delayed in several communities because the large fire station doors are jammed closed and require the doors to be cut open to allow fire vehicles to respond.

Within minutes after the shaking stops public safety personnel able to response start to conduct pre-designated surveys of their area to report on damage and existing conditions. This information is collected and provided to the Emergency Operations Center in each community that relays the information to each region. Each region receiving damage and status information then transmits it to the Governor's Office of Emergency Services in Sacramento. Large fires with conflagration potential are the only fires where mitigation is attempted if water supplies are available.

Mutual aid is requested by all of the affected communities, but with most Southern California communities damaged, public safety and public works mutual aid resources must come from much farther away and thus take longer to arrive. OES collects the multiple requests for mutual aid and prioritizes the requests. Mutual aid and disaster assistance requests are submitted to the unaffected areas in Northern California, nearby States and the federal government. Northern California-based resources will start to arrive within 12–24 hours. Nearby States and federal resources will start to arrive within 48–72 hours. The size of the affected area, disrupted transportation routes and multiple severely damaged structures will require 7-10 days for emergency response resources to access less than 50% of the disaster sites. Rescue efforts will transition to body recovery efforts within 14-21 days.

Local public safety officials prioritize the urban search and rescue efforts in each community. Initial primary searches are focused on those locations with the largest concentrations of potentially live victims (i.e., schools, colleges, hospitals, apartment buildings, large businesses and shopping malls).

With the limited number of urban search and rescue resources available due to the other significant hazards being simultaneously addressed, only those victims who can be easily accessed and removed from the buildings are rescued first. Those victims more heavily entrapped are identified and rescued later when additional resources are available because each of these victims can require 4-8 hours to access and extricate.

Initial hazardous material response efforts concentrate on those incidents forming moving toxic vapor clouds and large leaks of volatile chemicals that can endanger a sizable number of the local population.

Because Swiftwater/Flood Search and Rescue activities are ancillary duties of public safety personnel, these local resources will become available when other more immediate hazards such as large fires and escalating hazardous material incidents are mitigated.

Wilderness Search and Rescue resources will be deployed into the area to assist with surface rescue and extrication of victims from structurally stable buildings. They will conduct large grid area searches and be able to assist local officials with damage identifications and reconnaissance efforts.

Lessons from Post-2003 Disasters

California-based US&R and specialized emergency response teams[1] have been deployed to a series of disaster sites since the release of the original US&R Report in 2003. Based on the experiences and current status of those teams, the Urban Search and Rescue Emergency Advisory Committee concluded that:

- Major earthquakes and other large-scale disasters (such as the San Bernardino – earthquake described in the *Scenario*) are infrequent, but inevitable. As such, training on incident management, unified command, planning and incident support is essential for personnel at local, county and state levels.

- In the event of a major earthquake in California, all local emergency response resources will be overwhelmed.

- Following a major earthquake in their area, local communities cannot rely on neighboring jurisdictions for emergency assistance because the neighboring localities will themselves be overwhelmed.

- In the event of a major earthquake, assistance from resources outside of California will be delayed by as much as 48-72 hours due to travel distance, the availability of transportation, and damage to routes leading into the impact area.

- Following a major earthquake, the possibility of civil unrest exists and as such, protection for response resources would be necessary as was the case in the aftermath of Hurricane Katrina.

- It is critical that on-site local and state officials be authorized to have immediate access to emergency funds in order to avoid logistics support failures by FEMA as occurred in the aftermath of Hurricane Katrina.

- Aside from existing emergency funding arrangements that rely principally on reimbursements, OES (as lead agency for disaster response support) must be able to access funds to support immediate on-site response and recovery efforts. The arrangement should be modeled on the "e-Fund" or "Surge Account" mechanisms utilized by FEMA.

- Communications is the single most important element to emergency response and incident management. In large-scale disasters, communications becomes even more critical.

- Full-range radio interoperability needs to be recognized as a high priority and funded accordingly. A temporary stopgap emergency communication capability

[1] Specialized emergency response teams include Hazardous Material teams, Swiftwater/Flood Search and Rescue teams, Wilderness Search and Rescue teams and Law Enforcement Force Protection teams.

for use at the local level must be identified and provided until adequate funding is obtained to mitigate the State's more comprehensive communications challenges.

- Intelligence-sharing among levels of response agencies is essential for operational success

Local Emergency Response Teams Rely on State Assistance

In Section 8601 of the Government Code, the Legislature observes that:

- The ability of emergency response agencies, particularly those operating under Mutual-Aid Agreements, to respond expeditiously and effectively during disaster situations is critical to saving lives and preserving property.

- To maintain an effective response capability, there is a need for a coordinated planning strategy to address the ongoing resource needs of emergency response agencies, including urban search and rescue units.

- The emergency response equipment being utilized by many local agencies is aging, and less effective than newer equipment being developed and made available to local emergency response agencies.

- Emerging technological advances are continuing to develop emergency response equipment that is effective and efficient, yet costly to local government agencies.

Consequently, by enactment of Government Code Section 8601, the State of California recognizes that it is necessary for the State, as part of the statewide Mutual Aid System, and in the interest of protecting the lives and property of its residents, to assist local agencies with the planning resources affecting Mutual Aid. Specifically, that assistance should enable Mutual Aid resources to maximize their effectiveness in responding to and managing emergencies faced by the state, as well as local and regional communities.

State's Earthquake Plan Requires Assistance be Provided to Local US&R Teams. In addition, the *California Earthquake Loss Reduction Plan, 2002-2006*[2], the State's official earthquake management strategy, calls for the statewide improvement of Urban Search & Rescue teams. According to the Plan, the improvement of the Urban Search & Rescue teams should be a priority for the State's emergency management and response infrastructure. Specifically, the Plan directs that the State of California:

- Establish and maintain strategically located Urban Search & Rescue team training facilities that are properly equipped and staffed to provide real-time preparedness training for emergency response personnel.

- Ensure that all teams have a complete cache of specialized Urban Search & Rescue equipment.

- Provide adequate resources for maintenance and replacement of specialized urban search and rescue equipment cache.

[2] The California Earthquake Loss Reduction Plan, a five-year strategic plan, is published by the California Seismic Safety Commission, as mandated by Government Code Section 8870, *et seq*.

Apartment building damaged during Northridge Earthquake.

California Master Mutual Aid System

Local public safety agencies, typically fire departments, throughout the State vary in their abilities to respond to a full range of emergencies. When conditions exceed the capacity or capability of a jurisdiction's services, personnel or equipment "Mutual Aid" agreements facilitate assistance from other jurisdictions. A local jurisdiction's ability to manage a local disaster or emergency will depend on several factors:

- The total number and capabilities of local resources directly available to the jurisdiction;
- Magnitude, intensity, or severity of the emergent situation or incident;
- Available qualified staff of the local jurisdiction;
- Total number and capabilities of nearby Mutual Aid resources available to the jurisdiction; and
- Direct impact of the disaster on the resources of the local jurisdiction.

For example, when a large earthquake strikes, the distance from the epicenter can be a major factor. Emergency response resources closest to the epicenter will be subjected to the most damage and may have limited response capabilities. Injuries to emergency responders and damage to buildings, apparatus, and transportation arteries will impede emergency response.

The vehicle for providing Mutual Aid among local governments and the State is the California Master Mutual Aid Agreement. The Agreement establishes responsibilities and procedures by which fire, rescue, law and other disciplines throughout the State receive and/or render aid. Under the terms of the Agreement, no local agency shall be required to unreasonably deplete its own resources in furnishing mutual aid. The Agreement is administered through the California Governor's Office of Emergency Services (OES).

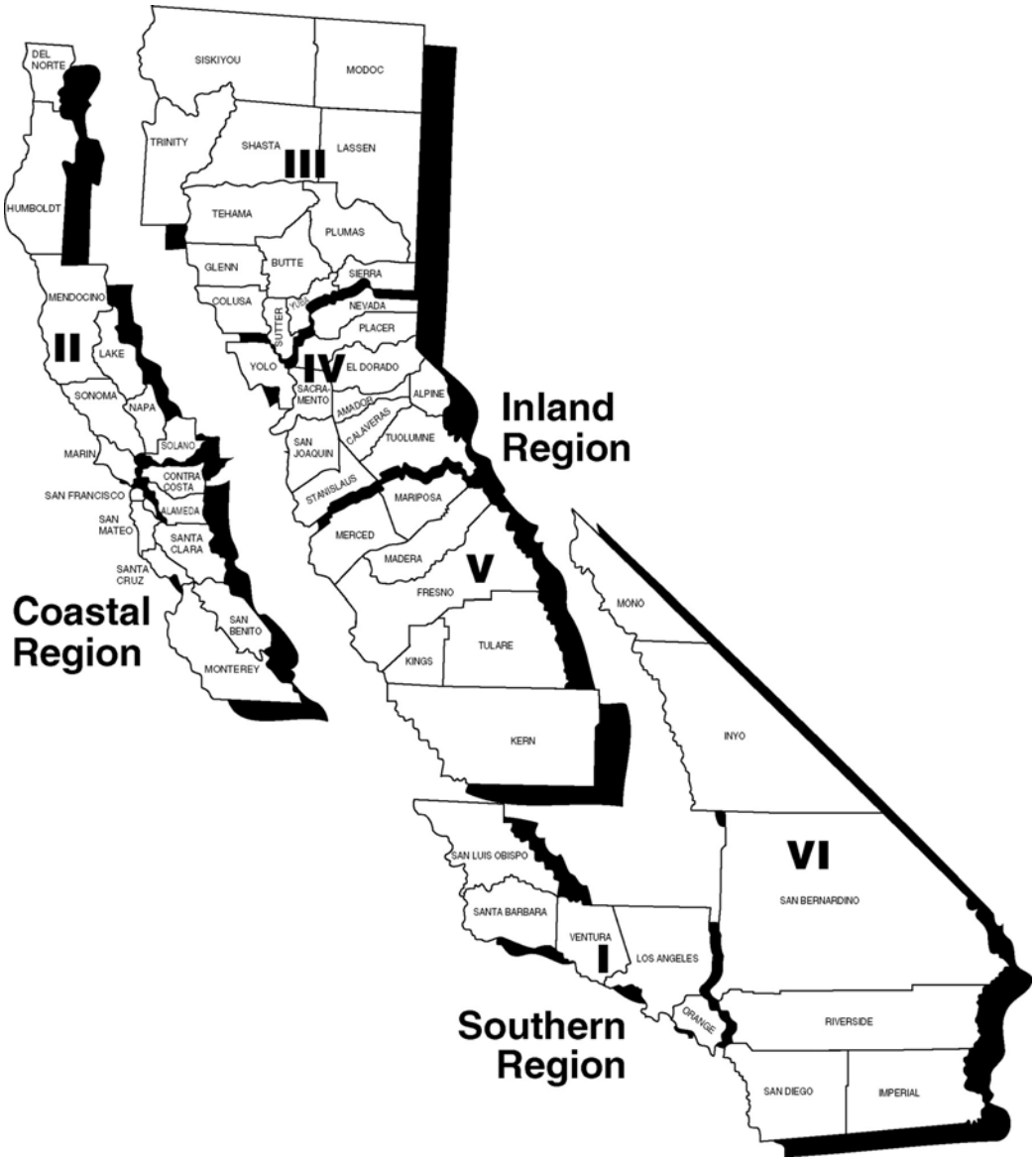
The Agreement requires that all of its signatories will provide or receive emergency response resources, as requested. This interchange of resources is available on a local, regional, State, and interstate basis. Repairs to and/or replacement of any damaged equipment while assisting in a mutual aid capacity is the sole responsibility of the jurisdiction providing the requested assistance.

Under the State's Master Mutual Aid System, the State of California is divided into six Mutual Aid Regions. Each of the State's 58 counties is considered an "Operational Area" and is geographically located in a Region to maximize mutual aid coordination.

Some emergency response agencies having recently established or upgraded their US&R and Hazardous Material response capability through federal homeland security grant funding and are required to participate in the Master Mutual Aid System. While other agencies still need financial assistance to obtain some of the more costly items and training to be comply with OES standards.

Figure 1 shows the existing regions of the California Master Mutual Aid System, as assigned and under the supervision of OES.

Figure 1
California Master Mutual Aid System Regions



California Specialized Emergency Response Resources

California's Specialized Emergency Response Resources consist of:

- Local Urban Search and Rescue teams;
- Regional Urban Search and Rescue task forces;
- State/National Urban Search and Rescue task forces;
- Hazardous Materials Response resources;
- Swiftwater/Flood Search and Rescue teams;
- Wilderness Search and Rescue teams; and
- Law Enforcement Force Protection teams.

Local Urban Search & Rescue Resources

Local Urban Search and Rescue resources include US&R Companies and Crews.

A **US&R Company** consists of personnel trained to perform search and rescue operations at incidents where technical expertise and equipment are required. US&R Companies also include a specific cache of technical rescue equipment and transportation.

A **US&R Crew** consists of specially trained personnel that either augment or supplant (relieve) a US&R Company. US&R Companies and Crews are categorized based their operational capability by the OES Fire & Rescue Branch. The US&R Operational System Description[3] identifies the four category types, or levels, of operational capability as **Basic, Light, Medium and Heavy**. Each of the four types represents a minimum capability to conduct safe and effective search and rescue operations at structure collapse or structure failure incidents and other emergencies where specialized rescue equipment and technical expertise are required. The funding for staff, equipment and training come primarily from local agency budgets.

[3] Urban Search and Rescue Operational System Description ICS-US&R-120-1, Firescope, January 2004.

The **US&R Type-4 "Basic**" Operational Level includes the equipment and personnel to conduct safe and effective search and rescue operations at incidents involving non-structural entrapment in non-collapsed structures. Three trained personnel are assigned to each "Basic" US&R Company or Crew. Example: Rescue of a person trapped under furniture in an otherwise intact structure.

Example of entrapment under heavy furniture.

The **US&R Type-3 "Light**" Operational Level includes equipment and personnel to conduct safe and effective search and rescue operations at structure collapse incidents involving the collapse or failure of Light Frame Construction and/or low angle or one-person load rope rescue. Three trained personnel are assigned to each "Light" US&R Company or Crew. Example: Rescue from a collapsed wood-frame dwelling.

Light frame construction collapse.

The **US&R Type-2** "**Medium**" Operational Level includes equipment and personnel to conduct effective search and rescue operations at structure collapse incidents involving the collapse or failure of heavy wall construction, high angle rope rescue (excluding highline systems), confined space rescue (no permit required[4]), and trench and excavation rescue. Six trained personnel are assigned to each "Medium" US&R Company or Crew. Example: Rescue from a collapsed masonry structure.

Heavy wall construction collapse.

[4] "No-permit-required-for-confined-space-entry refers to Cal OSHA regulations governing work (including rescue) in confined spaces.

The **US&R Type-1 "Heavy**" Operational Level includes equipment and personnel to conduct search and rescue operations at structure collapse incidents involving the collapse or failure of heavy floor, pre-cast concrete and steel frame construction, high angle rope rescue (including highline systems), confined space rescue (permit required)[5], and rescue from mass transportation vehicles. Six trained personnel are assigned to each "Heavy" US&R Company or Crew. Example: Rescue from large steel frame or concrete structures.

Heavy floor construction collapse.

Regional Urban Search & Rescue Task Force

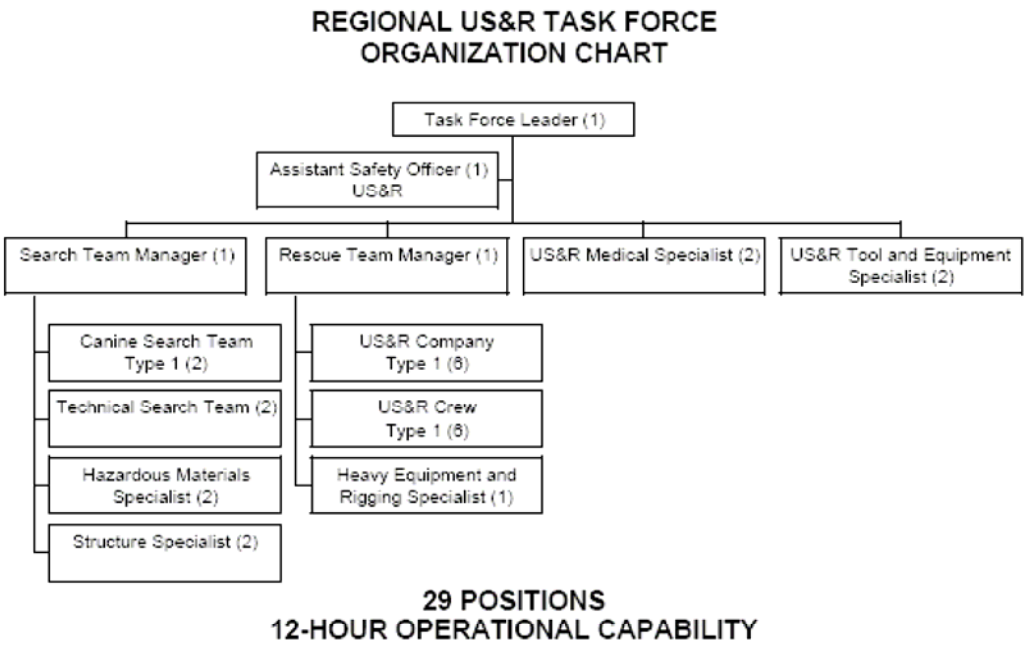
A **Regional US&R Task Force** consists of 29 personnel, specially trained and equipped for large or complex urban search and rescue operations. The multi-disciplinary organization provides five functional elements that include Supervision, Search, Rescue, Medical, and Logistics. Transportation and logistical support is provided by the sponsoring agency and may be supported by the requesting agency. The Regional US&R

[5] Permit–required confined space entry refers to Cal OSHA regulations governing work (including rescue) in confined spaces and is more stringent than "no-permit-required" confined space entry.

Task Force is totally self sufficient for the first 24 hours. The funding for staff, equipment and training comes primarily from local agency budgets.

Figure 2 illustrates the positions and organizational structure of the Regional US&R Task Force.

Figure 2



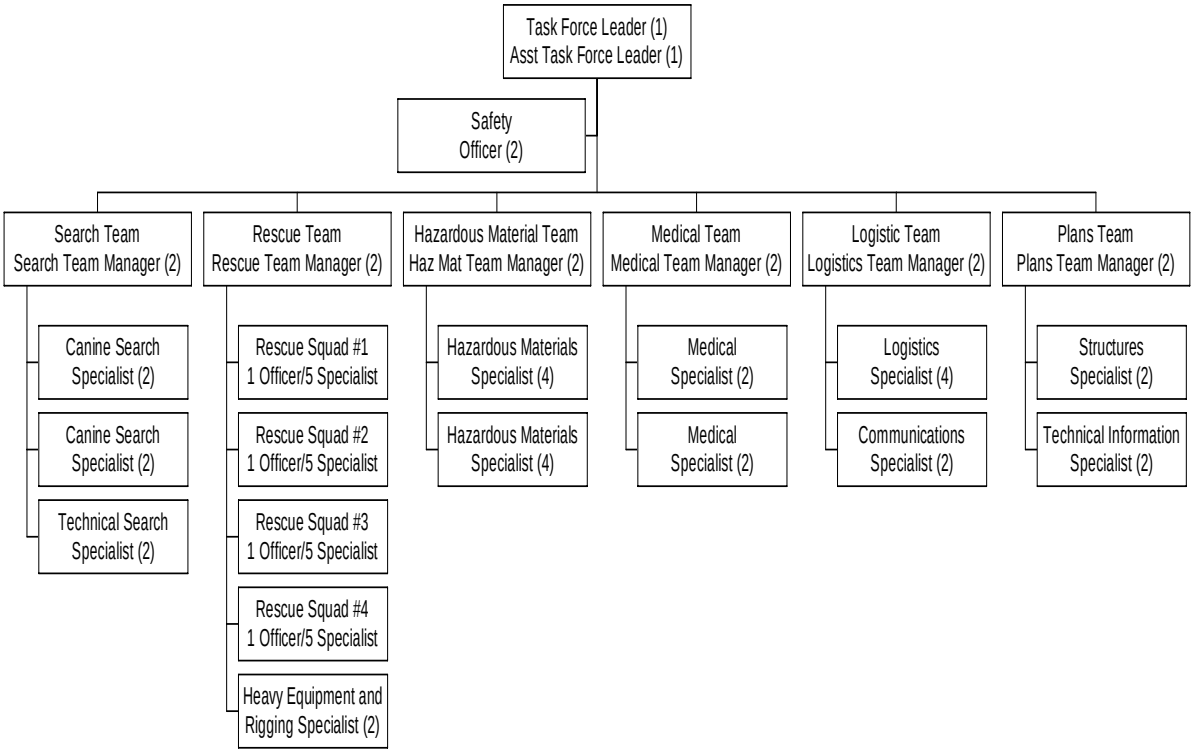
State/National Urban Search & Rescue Task Force

A **State/National US&R Task Force** consists of 70 personnel specially trained and equipped for large or complex urban search and rescue operations and represents the highest level of urban search and rescue capability. The multi-disciplinary organization provides seven functional elements that include Supervision, Search, Rescue, Haz-Mat (hazardous materials), Medical, Logistics and Planning. The State/National US&R Task Force is designed to be used as a “single resource,” however, each element of the Task Force is modularized into functional components and can be independently requested and utilized. A State/National US&R Task Force is accompanied by an Incident Support Team (IST) when deployed out of state. The IST provides overhead management and logistical support to the US&R Task Force while on deployment. State/National US&R Task Forces responding from other states will work with the local incident command structure through the IST.

Figure 3 illustrates the positions and the organizational structure of the State/National US&R Task Force.

Figure 3

STATE/NATIONAL US&R TASK FORCE ORGANIZATION CHART



When a State/National US&R Task Force is deployed to an incident, 70 US&R Task Force personnel respond. In order to deploy 70-member teams, each task force maintains a roster of trained personnel for a total of 210 members (3 personnel per position). At the disaster site, each position is duplicated within a deployed Task Force providing the ability to operate two 12-hour shifts, 24 hours a day.

The State/National US&R Task Force is totally self-sufficient for the first 72 hours and has a full equipment cache to support its operation. The equipment cache deployed with each Task Force is valued at $2 million. In addition, local, state or federal resources[6] may provide transportation and logistical support.

The members of a State/National US&R Task Force train year-round to be ready for a deployment. These training requirements involve a significant commitment of funding

[6] Supplemental resources or services may be provided by the U.S. Air Force, California Highway Patrol, California Military Department, and Emergency Medical Services Authority, and other private charters.

and resources from local sponsoring and participating agencies (typically the local fire service).

State/National US&R Task Force members consist primarily of firefighters and other disciplines or professions such as medical, law enforcement, structural engineering, heavy equipment operators, construction professionals and canine search handlers. Most of these participants volunteer their hours for training and preparation.

70-member California-based State/National Urban Search and Rescue task force.

The federal government has established 28 State/National US&R Task Forces throughout the nation able to deploy within 6 hours of notification. As of January 2006, all 28 State/National Task Forces are trained and equipped to respond to incidents involving weapons of mass destruction.

Figure 4 contains a map indicating the location of the 28 State/National US&R Task Forces.

Figure 4

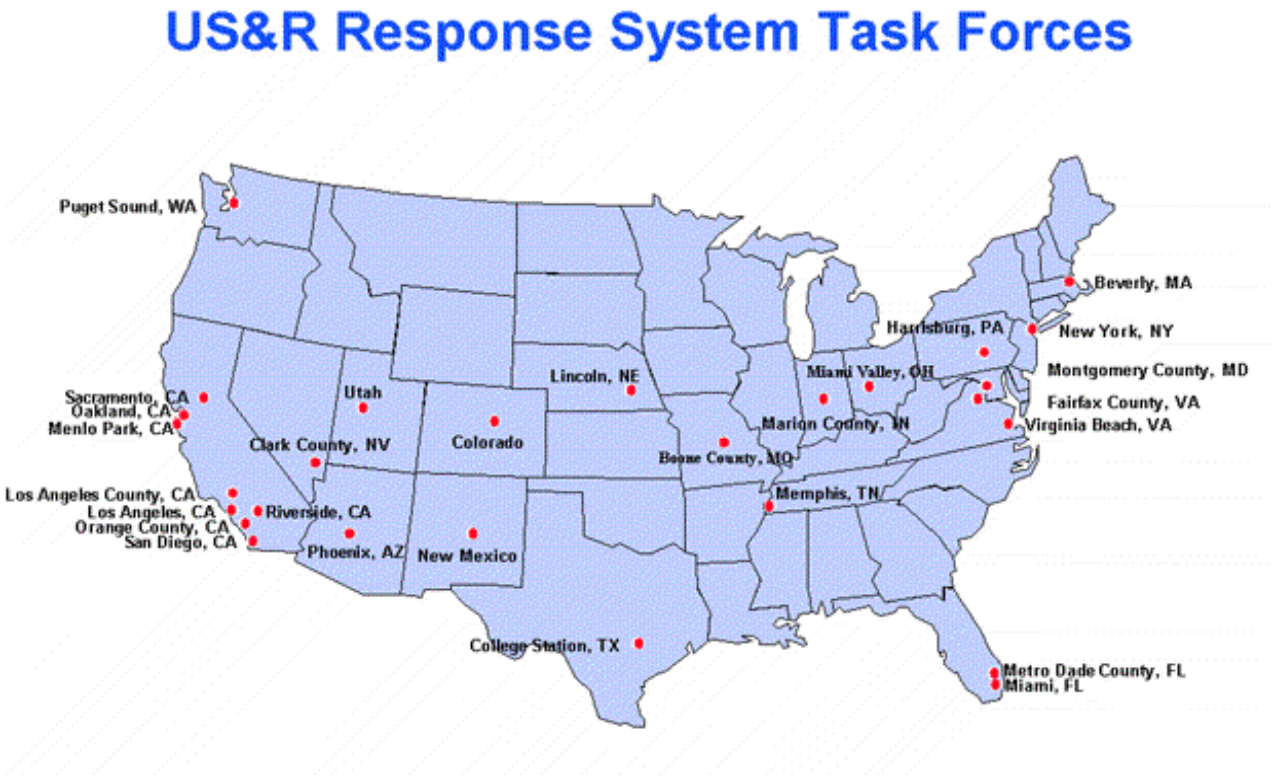
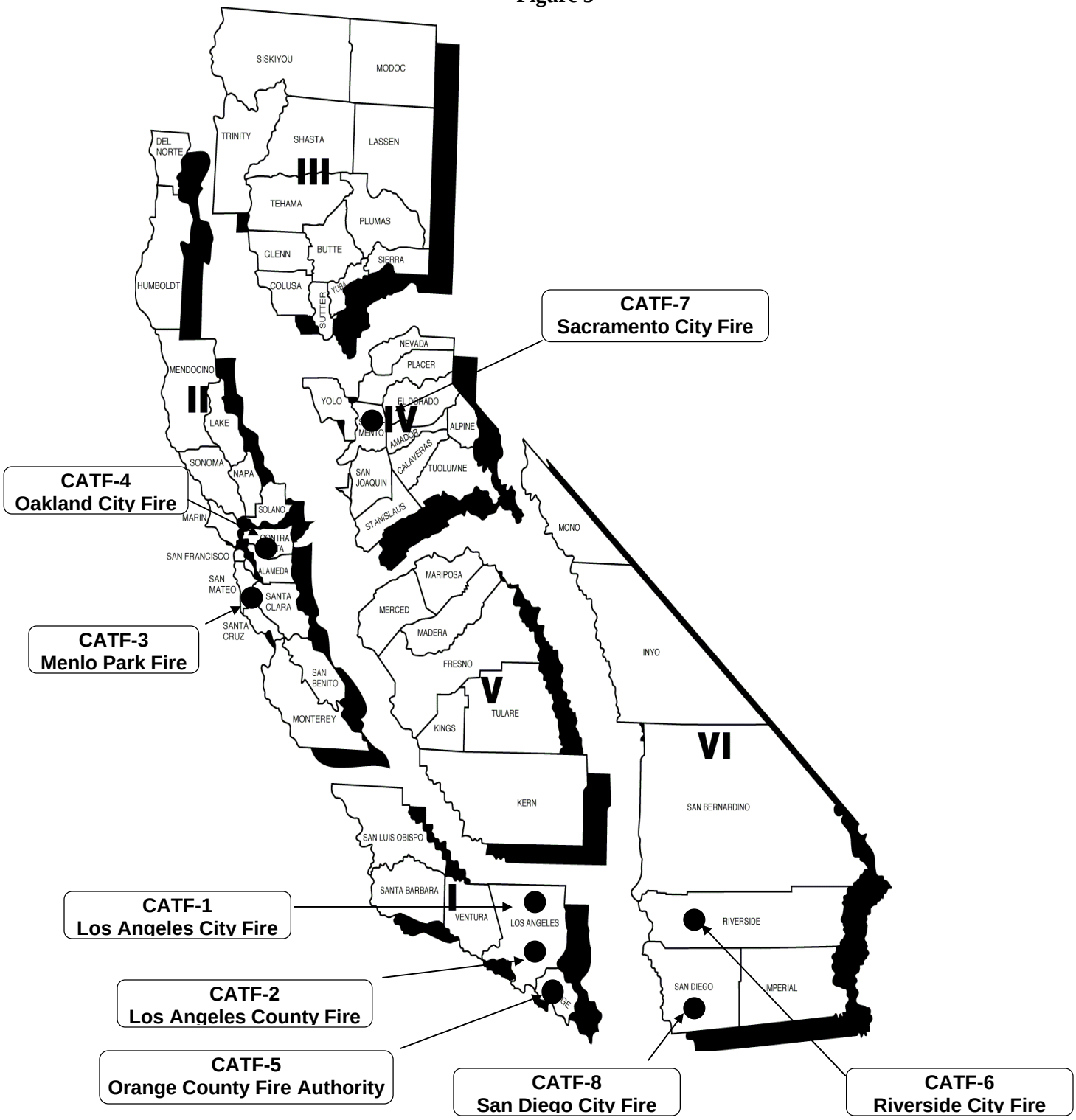

US&R Response System Task Forces
Puget Sound, WA
Beverly, MA
Harrisburg, PA
New York, NY
Montgomery County, MD
Fairfax County, VA
Virginia Beach, VA
Miami Valley, OH
Marion County, IN
Lincoln, NE
Utah
Sacramento, CA
Oakland, CA
Menlo Park, CA
Clark County, NV
Colorado
Boone County, MO
Memphis, TN
Los Angeles County, CA
Los Angeles, CA
Orange County, CA
San Diego, CA
Riverside, CA
Phoenix, AZ
New Mexico
College Station, TX
Metro Dade County, FL
Miami, FL

Figure 5 illustrates the locations and sponsoring jurisdictions of California's eight State/National US&R Task Forces.

Figure 5



Tables 1-A and 1-B show the capabilities and components of the different US&R resource types.

Table 1-A

URBAN SEARCH & RESCUE RESOURCE CAPABILITIES

Type of Emergency	**BASIC** (Type 4)	**LIGHT** (Type 3)	**MEDIUM** (Type 2)	**HEAVY** (Type 1)
Surface Rescue	✓	✓	✓	✓
Nonstructural Entrapment (in non-collapsed structures)	✓	✓	✓	✓
Light Frame Construction		✓	✓	✓
Low-angle or one-person load rope rescue)		✓	✓	✓
Heavy Wall Construction			✓	✓
High-Angle Rope Rescue (No Highline systems)			✓	✓
Confined Space Rescue (no permit required)			✓	✓
Trench and Excavation Rescue			✓	✓
Heavy Floor Construction				✓
Pre-cast Concrete Construction				✓
Steel Frame Construction				✓
High-Angle Rope Rescue (Highline systems)				✓
Confined Space Rescue (permit required)				✓
Mass Transportation Rescue				✓

Table 1-B

URBAN SEARCH & RESCUE RESOURCE COMPONENTS

Unit	Equipment	No. of Personnel	Provides its own Transportation
US&R Company			
BASIC	Yes	3	Yes
LIGHT	Yes	3	Yes
MEDIUM	Yes	6	Yes
HEAVY	Yes	6	Yes
US&R Crew			
BASIC	No	3	Yes
LIGHT	No	3	Yes
MEDIUM	No	6	Yes
HEAVY	No	6	Yes
Regional US&R Task Force	Yes	29	Yes
State/National US&R Task Force	Yes	70	Yes

Hazardous Material Response Resources

Hazardous Material Response resources include specially trained and equipped Hazardous Materials Companies and support personnel. A Hazardous Materials Company consists of personnel trained to perform analytical, preventive and corrective actions at the scene of a suspected or known chemical or biological emergency. Support personnel provide necessary ancillary functions to prevent further contamination and perform decontamination activities.

The OES Fire and Rescue Branch categorizes Hazardous Materials Companies based on their operations capability. There are three category types of operational capability. Each of the three types represents a minimum capability to conduct analytical, preventative and corrective actions at the scene of a suspected or known chemical or biological emergency where specialized hazardous materials response equipment and technical expertise are required. The funding for staff, equipment and training comes primarily from local agency budgets.

The **Type III Hazardous Materials Company** includes the equipment and personnel to conduct operations at incidents involving known chemicals. Five trained personnel are assigned to each Type III Hazardous Materials Company.

The **Type II Hazardous Materials Company** includes the equipment and personnel to conduct operations at incidents involving known and unknown chemicals. Five trained personnel are assigned to each Type II Hazardous Materials Company.

The **Type I WMD/Hazardous Materials Company** includes the equipment and personnel to conduct operations at incidents involving known and unknown chemicals and WMD chemicals and biological agents. Seven trained personnel are assigned to each Type I WMD/Hazardous Materials Company.

Swiftwater/Flood Search and Rescue Resources.

Swiftwater/Flood Search and Rescue (SF/SAR) Teams are composed of local fire departments, law enforcement agencies, and lifeguards. SF/SAR teams are categorized as to their operational capability, based on specialized training, skills and equipment.[7] The four category types of operational capability are based on team qualifications, available equipment and training, as needed for safe and efficient rescue operations for identified SF/SAR tasks. The funding for staff, equipment and training comes primarily from local agency budgets. The State OES provides limited funding for equipment and training for State-sponsored teams.

Table 2 illustrates the components and types of the Swiftwater/Flood Search and Rescue teams.

Table 2
Swiftwater/Flood Search and Rescue Teams

Unit	Equipment	No. of Personnel	Provides its own Transportation
Swiftwater/Flood Search and Rescue Classification			
Type I	Type I inventory	14	Yes
Type II	Type II inventory	6	Yes
Type III	Type III inventory)	4	Yes
Type IV	Type IV inventory	3	Yes

The **Type IV Swiftwater/Flood Search and Rescue Team** includes the equipment and personnel to conduct operations at incidents involving low risk, land based search and rescue in static or dynamic water. Three personnel are assigned to each Type 4 Swiftwater/Flood Search and Rescue Team. Example: Rescue of a victim by throwing a tethered flotation device and pulling them to shore.

The **Type III Swiftwater/Flood Search and Rescue Team** includes the equipment and personnel to conduct operations at incidents involving water based contact rescues of persons as well as animals utilizing non-powered watercraft in static or dynamic water. Four personnel are assigned to each Type 3 Swiftwater/Flood Search and Rescue Team. Example: Rescue of stranded victims and their pets from rising floodwaters via a rowboat.

The **Type II Swiftwater/Flood Search and Rescue Team** includes the equipment and personnel to conduct operations at incidents involving water based contact rescues of

[7] (ICS SF/SAR 020-1).

persons and animals employing powered watercraft, technical rope systems and/or helicopters in static or dynamic water. Six personnel are assigned to each Type 2 Swiftwater/Flood Search and Rescue Team. Example: Rescue of a victim being swept away in swift moving water by inserting a rescuer into the water by helicopter and picking them up with a powered inflatable rescue boat.

The **Type I Swiftwater/Flood Search and Rescue Team** includes the equipment and personnel to conduct operations at incidents involving water-based contact rescues of multiple persons and animals employing powered watercraft, technical rope systems and/or helicopters in static or dynamic water. Fourteen personnel are assigned to each Type 1 Swiftwater/Flood Search and Rescue Team. Example: The management and support of multiple simultaneous rescue operations employing any of the techniques previously described.

Orange County-based Swiftwater/Flood Search and Rescue team deployed in Louisiana (2005)

Wilderness Search and Rescue Resources

Wilderness Search and Rescue resources provide an organized team of trained and equipped personnel with a variety of skills at a disaster site. Specially trained Wilderness Search and Rescue resources provide personnel to perform Swiftwater/Flood and Open Water Search and Rescue, physical and canine search, low and high angle rope rescue, and emergency incident management. Several teams are cross-trained to the US&R Type 4 "Basic" training standards.

Wilderness Search and Rescue resources are mobilized through the OES Law Enforcement Branch. Fifty-seven of the fifty-eight County Sheriff's Departments in California currently operate Wilderness Search and Rescue teams. Some counties operate multiple teams. Other non-profit Search and Rescue teams such as Mountain Rescue supplement these teams.

Wilderness SAR team at La Conchita mudslide (Ventura County, 2005).

Law Enforcement: Force Protection

Major catastrophic events not only bring out the best in humanity, they can also reveal some of the worst. As witnessed in the response to the 2005 Hurricane Katrina disaster, some frustrated victims and other impacted residents assaulted first responder personnel.

Major events of destruction can cause a breakdown of normal lawful behavior. Therefore, an organized emergency response may call for qualified and trained law enforcement contingent. Law enforcement personnel are responsible for restoring order but also for providing "force protection" to other emergency response personnel that are engaged in managing the disaster, rescuing the injured and recovering fatalities.

Technical markings placed by the Orange County (CA.)-based SW-SAR on New Orleans (2005).

Inventory of Specialized Emergency Response Resources

Table 3 illustrates the inventory of Specialized Emergency Response Resources within the Master Mutual Aid System as reported by the California OES Fire and Rescue Branch, as of March 2006:

Table 3

Inventory of Specialized Emergency Response Resources

Resource Type	Officially Typed by OES
Urban Search & Rescue[8]	
US&R Type-1 "Heavy" Company	32
US&R Type-2 "Medium" Company	25
US&R Type-3 "Light" Company	(Local Govt.) 21 (OES) 62
Regional US&R Task Force	6
State/National US&R Task Force	8
Hazardous Materials Response	134
Hazardous Materials Company (Type I)	
Hazardous Materials Company (Type II)	
Hazardous Materials Company (Type III)	
Swiftwater/Flood Search & Rescue	
Swiftwater/Flood Search & Rescue Team (Type I)	10
Swiftwater/Flood Search & Rescue Team (Type II)	
Swiftwater/Flood Search & Rescue Team (Type III)	
Swiftwater/Flood Search & Rescue Team (Type IV)	
Wilderness Search and Rescue	58
Wilderness Search and Rescue Team	

[8] (See Appendix for a complete summary of the current inventory and distribution of local US&R resources as currently recognized by OES.)

Basis of Urgency

Incidents requiring specialized emergency response resource intervention can be caused by a range of events, such as an earthquake or terrorist incident that causes widespread damage to a variety of structures resulting in entrapment. Other examples of emergency events range from hazardous material leaks, flooding, mass transportation accidents with multiple victims to single site events such as a trench cave-in or confined space rescue involving only one or two victims.

First 24 Hours Critical . History demonstrates that local responders rescue the majority of live victims within the first 24 hours following a significant event that causes multiple structures to collapse or fail. Research on structure collapse incidents indicates if victims are not rescued within the first 72 hours, survivability drops to below 30 percent.

Delays to Emergency Response. Despite the strength and preparedness of California's Master Mutual Aid System and the Emergency Management System, the systems are vulnerable to a catastrophic seismic event that could impact multiple operational areas and regions throughout the state. The California local specialized emergency response resources and State/National US&R Task Forces could be directly impacted by a catastrophic earthquake and unable to assemble or respond until hours or even days after the event. This delay in emergency response was experienced in New Orleans in the hours and days following Hurricane Katrina's landfall. The hurricane's impact and subsequent flooding severely compromised the local fire and other emergency response agencies' ability to provide and sustain service. Following a significant earthquake, fire stations, police buildings, communication centers and storage facilities could collapse or be so damaged that vehicles and equipment may be destroyed, inoperable or inaccessible.

Local and close proximity resources responding to a wide-scale earthquake or other major disaster will be overwhelmed by the number of injured and trapped victims and will require Mutual Aid. Enough specialized emergency response personnel and equipment is not likely to be available with our present response system. If all eight of the State/National Task Forces in California were mobilized, they would be operational in 12-24 hours that is after the "window of survivability" begins to rapidly close in structural collapse situations.

Even if FEMA was able to immediately dispatch the remaining 20 State/National US&R Task Forces to such a large urban area earthquake, it would take 48-72 hours to get all the Task Forces in place and operational because of their transportation limitations. Once on scene, the 20 State/National US&R Task Forces would be assigned to no more than 20 large buildings or specific geographic areas with complex rescue situations. Military air transport resources are less available during overseas military operations. Private air transport carriers are not immediately available and ground transportation options (such as trains, trucks and buses) could take days to arrive in California.

The Current Inventory of Specialized Emergency Response Resources is Inadequate. The California US&R Program and other specialized emergency response resources, though diligently developed, are unable to address all current technical rescue needs without sufficient funding, especially given threats to public safety from recurring seismic activity, terrorism, and weapons of mass destruction. Insufficient funding for the initial and ongoing training demands is the most common impediment to local agencies implementing or adequately maintaining a specialized emergency response resource.

The eight State/National US&R Task Forces may not have the capacity to effectively handle the existing natural (earthquake, flood, fire) and non-natural (terrorism) threats to the State because most California cities on their own lack the ability to adequately address the effects of a major earthquake, terrorism or weapons of mass destruction that strike within their own communities. Following the occurrence of a catastrophic earthquake or other significant emergency incident, most public safety resources impacted by the emergency incident will not be able to honor standing mutual aid assistance agreements upon which many jurisdictions rely.

Within the current system, there is a very limited resource base to draw upon when needed. The specialized emergency response resources that do respond bring varied levels of skill and expertise, determined largely by their ability to purchase specialized equipment and apparatus, and by the training and experience of the personnel.

Growing Threat Posed by Hazardous Materials. California State/National US&R Task Forces and US&R trained personnel have responded to the Oklahoma City bombing, Pentagon and New York City World Trade Center (WTC) disasters, 2005 Gulf Coast hurricanes in addition to several other emergencies both inside and outside California. While at these incidents, significant hazardous material concerns and events during US&R operations have caused FEMA to increase the number of hazardous material specialists assigned to each State/National US&R Task Force. In addition to the increased number of trained staff, the volume and type of hazardous materials response team equipment required in the State/National US&R Task Force cache has also been significantly expanded.

Following the 1989 Loma Prieta and 1994 Northridge earthquakes local Hazardous Material Response Companies were overwhelmed responding to chemical leaks spills and damaged containers and facilities. In 2001 these highly trained and equipped teams were again overwhelmed responding to “white powder” calls resulting from the anthrax attacks on the East Coast. With the annual increase in number of industrial chemicals produced and the added threat of chemical or biological agent terrorist attacks the need to significantly increase the number of local Hazardous Material Response Teams is critical.

Swiftwater/Flood Search and Rescue Teams Deployed More Often Each Year. In 1996-97, the Yuba City and Marysville areas were inundated by floodwaters that overwhelmed local responders. Swiftwater/Flood Search and Rescue Teams (SF/SAR) from throughout the state were deployed to the Northern California region to perform search and rescue operations for several days. Since 1997, local SF/SAR Teams have

become better equipped and trained to a much higher level in order to meet their community's needs in the event of swiftwater or flood emergencies. When the rainy season of 2005 hit Southern California the local SF/SAR Teams were utilized almost on a daily basis during the storms. The Orange Fire Department SF/SAR Team responded to more than 20 swiftwater rescue incidents during the season, Los Angeles County and City Fire Department SF/SAR Teams responded to over 40 rescue events with several smaller fire agencies responding to localized events. During the same period, the San Bernardino County Fire Department handled 38 incidents.

The most dramatic example of the value of these SF/SAR teams is when Hurricane Katrina struck the New Orleans area resulting in massive flooding impacting over 80% of the urban area. Eight of the ten California-based OES Type-1 SF/SAR Teams were deployed to support rescue operations. Within the first 12 hours of their arrival in New Orleans these teams rescued and evacuated over 500 residents trapped by the rising floodwaters. The eight SF/SAR Teams worked daily for nearly three weeks until the floodwaters subsided

A major earthquake can damage a dam, levee and water storage tanks causing Swiftwater/Flood search and rescue operations to commence along with other land-based search and rescue operations. A major offshore earthquake can cause a tsunami and significant flooding in large urban cities along the California coast. SF/SAR Teams are critical for these types of rescue operations.

Potential for Catastrophic Damage and Loss of Life in California As devastating as the disasters were in Oklahoma City, at the Pentagon in Washington, DC and at the World Trade Center in New York , they would pale in comparison to the devastation caused by an earthquake of magnitude 8.0 in the Los Angeles Basin, the San Francisco Bay Area, or other large urban center in California. The current inventory of local and State/National US&R resources and Hazardous Material response resources would be unable to effectively respond to the thousands of emergency requests. The current inventory of local Swiftwater/Flood Search and Rescue teams would be equally overwhelmed following a tsunami or levee break caused by the earthquake.

Training Facilities Needed There is a growing urgency for appropriate technical rescue, hazardous material, and swift water rescue training facilities statewide. Currently, there are only three US&R training facilities (certified by the California State Fire Marshal and OES) that offer the four required courses at each campus site. They are:

- City of Anaheim (North Net Training Center)
- County of San Bernardino (Sewell Training Center)
- City of Camarillo (Ventura Regional Training Center)

Additional facilities[9] need to be constructed and existing facilities improved because the ability to deliver effective training to first responders is the single most important aspect of disaster preparedness in the modality of US&R, Hazardous Materials and Swiftwater/Flood Search and Rescue teams. While proper equipment is indispensable to effective specialized resource operations, without proper training, the availability of equipment in the hands of untrained and unqualified personnel is a tragically wasted and potentially dangerous resource.

What are the Benefits of Expanding Local Specialized Emergency Response Resources?

- Enhances existing capabilities and establishes additional US&R "Heavy", Type I Hazardous Materials and Swiftwater/Flood Search and Rescue resources in each Operational Area.

- Expedites the availability of specialized emergency response resources within the first 24 hours, resulting in fewer fatalities and less severe injuries.

- Produces more efficient and expedited delivery of emergency response resources.

- Reduces response time due to loss of locally impacted specialized emergency response resources.

- California would be taking an effective proactive role in preparing for future catastrophic events.

[9] Need 2-3 training centers per region.

California's Current Emergency Response Resource Needs

The Governor's Office of Emergency Services --citing in part the Seismic Safety Commission's 2003 Report on California's US&R resources—recently concluded that augmenting the existing emergency services system was justified. The OES observed that expansion of the US&R, Hazardous Material response, and Swiftwater/Flood Search and Rescue capabilities system would enable the State of California to continue its work toward:

- Integrating the National Incident Management System (NIMS) with California's Standardized Emergency Management System (SEMS) and institutionalized knowledge of the operational role each element of Urban Search & Rescue assets play in response to a man-caused or natural disaster in the State of California;

- Enhancing California's support of Local, Regional, State, and National US&R system capabilities for all hazards to include man-made and natural disasters;

- Ensuring response capabilities for all levels of US&R in California through a series of state-of-the-art training programs to maintain pace with attrition of personnel throughout the system and train newly assigned personnel as new US&R elements are added into the State's Master Mutual Aid System;

- Ensuring that each level of US&R emergency response in the State is properly tested, consistent with current Federal and State guidelines requiring multi-operational period readiness capability exercises;

- Enhance and support the local US&R program which is the first and most critical of the three US&R response tiers;

- Strengthening California's existing relationship with FEMA's US&R Program Office in supporting the eight State/National US&R Task Forces.

- Enhance development and support of the 29-person Regional US&R Task Force program in California's six Master Mutual Aid Regions;

- Expanding and supporting the existing Master Mutual System OES Type-3 Light Engine Company Program and bringing to fruition the 18 OES US&R Type I "Heavy" emergency response vehicles called for in the Loma Prieta Earthquake "After Action" Report.

- Initiating a complete inventory and typing of Califoirnia's Hazardous Material companies.

- Initiating a complete inventory and typing of California's Swidftwater/Flood Search and Rescue teams.

Current Critical Needs

The Urban Search and Rescue Emergency Advisory Committee reviewed the existing level of local US&R, Hazardous Materials and Swiftwater/Flood Search and Rescue resources and assessed the need to maintain or increase the supply of these specialized resources. The Committee re-visited the critical needs identified in the 2003 Report and re-evaluated those identified needs against post-2003 threats to public safety posed by earthquakes, terrorist attacks and other disasters. Based on that review the Committee updated the 2003 critical needs report to reflect present conditions, existing and required specialized resources and current costs. A summary of that reassessment is presented in Table 4.

The table describes $284 million in current needs in distinct areas: Vehicles, Equipment, Communications, Training Facilities and ongoing Training needs. With the exclusion of Item IX "Training Maintenance," all the listed areas require a one-time funding to address the current critical needs. The estimated $9.5 million for ongoing training is needed on an annual basis.

As indicated in Table 4, the Committee finds a current need for:

- 18 US&R Type 1 "Heavy" vehicles plus equipment, at unit cost of $1 million.
- Event site universal radio communications equipment for each of the six OES regions, at a cost of $1 million per region.
- 18 Hazardous Material vehicles plus equipment, at a unit cost of $1 million.
- 18 Swiftwater/Flood Search and Rescue vehicles plus equipment, at a unit cost of $125,000.
- The construction of six new ("All-Risk") training facilities, estimated at $20 million per facility.
- The rehabilitation of three existing training facilities, estimated at $13.3 million per facility.
- The acquisition of eleven complete equipment caches for use at the nine training facilities and two mobile training units, at a cost of $3 million per cache.
- The acquisition of required equipment for existing local and regional US&R, Hazardous Material, and Swiftwater/Flood Search and Rescue teams, at a cost of $35 million.
- Initial required training for the 18 new Type 1 US&R WMD/Haz Mat and SF/SAR teams, at a cost of $11.5 million.

Table 4

Summary of Vehicles, Equipment, and Training Needs for Specialized Emergency Response Resources in California

Item	*Unit Cost Detail*	*Estimated Amount ($ millions)*
I. US&R TYPE I VEHICLES		
US&R Type I "Heavy" Vehicle + Equipment	18 each @ $ 1 million/unit	$18.0
II. COMMUNICATIONS		
For event-site universal radio communications capability (1/OES region)	(6 OES regions)	6.0
III. TYPE I HAZARDOUS MATERIALS VEHICLES		
Hazardous Materials Vehicle + Equipment	18 each @ $ 1 million/unit	18.0
IV. S/F SAT TYPE 1 VEHICLES		
S/F SAR Vehicle + Equipment	18 each @ $125,000/unit	2.3
V. TRAINING FACILITIES		
1/OES Region ("All-risk" training capability)	6 facilities (new construction) @ $20 million each 3 existing facilities (rehabilitated) @ $ 13.33 million each	120.0 40.0
VI. TRAINING FACILITY AND MOBILE TRAINING UNIT EQUIPMENT CACHE	9 units for 9 training facilities; 2 units for 2 mobile training units	33.0
VII. LOCAL /REGIONAL US&R, HAZ MAT & SW/SAR TEAM EQUIPMENT		35.0
VIII. TRAINING (see Appendix for detail)	18 US&R Type I "Heavy" and 18 WMD/Haz Mat & 18 Type 1 SF/SAR teams (at three personnel in each required position)	11.5
IX. TRAINING MAINTENANCE		9.5*
Total (to address one-time needs) **Total (annual ongoing needs)**		**$ 283.8** **9.5**

***** Annual cost based on current attrition rate of 20% ($11.5 million) + $7.2 million for existing resources.

Findings

1. Victim survivability in collapsed structures dramatically decreases after the first 24 hours. California's eight State/National US&R Task Forces generally require a minimum of 12-24 hours to become fully operational. Consequently, it is imperative that trained and equipped local US&R, Hazardous Material and Swiftwater/Flood First-Responders are available for emergency response throughout California.

2. The ability of emergency response agencies, particularly those operating under mutual-aid agreements, to respond expeditiously and effectively during disaster situations is critical to saving lives and preserving property. Various factors, including local vulnerability (injuries and damage to local personnel, facilities and infrastructure) could compromise the responders' abilities to deliver prompt and effective services.

3. Local governments cannot shoulder alone the financial burden of developing and maintaining the personnel, equipment and training needs of local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue specialized emergency response resources. .

4. The benefits of well-maintained and equipped local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue specialized emergency response resources extend to regional and statewide jurisdictions.

5. The emergency response equipment being utilized by many local agencies is aging, and less effective than newer equipment being developed and made available to local emergency response agencies. Equipment storage space on existing specialized apparatus is inadequate for the size and volume of new and required equipment.

6. Emerging technological advances are continuing to develop emergency response equipment that is effective and efficient, yet costly to local government agencies. Among these new items: technical search cameras, specialized personal protective equipment, and monitors to detect the presence of nuclear, biological and chemical agents.

7. Training needs are critical to local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue specialized emergency response resources to implement new teams and retain effective existing teams. The impending retirement trained and experienced veterans within the next five years will deplete the knowledge, skill and experience of California's public safety personnel. Without a well-established standardized training program and adequate funding to train younger and less experienced public safety personnel, existing specialized emergency response teams may become less effective or available.

8. Interoperability among specialized emergency response resources is predicated on standardized training and equipment. Without adequate funding to establish standardized training facilities and to purchase the same tools and equipment being used throughout California, specialized emergency response mutual aid resources will be less effective and unable to work along side other specialized resources. A lack of interoperable training and equipment can potentially cause more injuries and deaths to victims and public safety personnel due to uncoordinated rescue efforts and or techniques.

9. An estimated $284 million is currently needed to support and enhance the existing state and local and State specialized emergency response resources. An additional $9.5 million is needed on an annual basis for ongoing training of personnel.

Recommendations

To address the vulnerabilities of the State's specialized emergency response capabilities, local resources must be improved to handle potential disasters.
To manage the magnitude of major disasters, the quantity and capabilities of local emergency response resources must be improved to effectively save lives, prevent property loss and reduce damage. To maintain an effective and credible response to disasters, the existing local emergency response resources must be enhanced.

The US&R Emergency Advisory Committee recommends:

1. The recommendations presented in the original 2003 edition of the Committee's Report to the Seismic Safety Commission remain valid and should be expeditiously implemented.

2. The State must actively support California's emergency response to earthquakes and other major disasters by enhancing specialized resources from local and/or State/National US&R Teams, Hazardous Material Response Teams, Swiftwater/Flood Search and Rescue Teams and Wilderness Search and Rescue Teams.

3. The State should immediately and aggressively pursue funding from federal, state and other public or private sources to finance the acquisition of vehicles and equipment, the construction and improvement of training facilities, and the expansion of specialized training.

4. The State should direct the Office of Emergency Services, in consultation with the California Seismic Safety Commission and the State Fire Marshal, to develop a detailed, multi-year master plan and timeline for the acquisition of the vehicles and equipment, the construction and rehabilitation of facilities and the expansion of specialized training for the improvement of local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue resources.

5. Communications infrastructure continues to be a problem for the State's emergency response. Full-range radio interoperability needs to be recognized as a high priority and funded accordingly. A temporary stopgap emergency communication capability for use at the local level must be identified and provided until adequate funding is acquired to mitigate the State's more comprehensive communications challenges.

6. Funding to construct additional storage space for emergency equipment caches is needed. Existing storage is inadequate for the large equipment caches necessary for each local, regional and State/National US&R, Hazardous Material, and

Swiftwater/Flood Search and Rescue Teams.

7. Actively support the improvement and expansion of local US&R, Hazardous Material and Swiftwater/Flood Search and Rescue resources;

8. Establish an Oversight Committee to supervise the State's efforts to carry out these recommendations in a timely, cost-effective and expedited manner.

Citizens at New York WTC site

APPENDIX

Agencies sorted by Mutual Aid Region

California Mutual Aid Region	Agency	ICS Type	Alpha - Company	Radio Designator	Date Typed	Zip Code Station Zip Code
I	Arcadia	1	Heavy		11/1/2004	91006
I	Beverly Hills Fire	1	Heavy		4/19/2005	90210
I	Downey, City of	1	Heavy	CA-RTF-03-01		90241
I	Long Beach Fire	1	Heavy	CA-RTF-02-01		90802
I	Los Angeles City	1	Heavy	UR-27	6/12/2005	90028
I	Los Angeles City	1	Heavy	UR-85	7/12/2005	90710
I	Los Angeles City	1	Heavy	UR-88	7/13/2005	91403
I	Los Angeles County	1	Heavy	US&R-103	10/7/2003	90660
I	Los Angeles County	1	Heavy	US&R-134	9/10/2003	93534
I	Montebello Fire	1	Heavy	US&R-560	5/16/2003	90640
I	Orange City Fire	1	Heavy		5/23/2003	92866
I	Pasadena Fire	1	Heavy			91101
I	Santa Ana Fire	1	Heavy	Squad-1	12/5/2003	92706
I	Santa Fe Springs	1	Heavy	CA-RTF-04-01		90670
I	Santa Monica Fire	1	Heavy	US&R-2	7/12/2005	90405
I	Ventura County Fire US&R-40	1	Heavy			93021
I	Ventura County Fire US&R-54	1	Heavy			93010
I	Vernon Fire	1	Heavy			90058
I	Anaheim Fire	2	Medium			92805
I	El Segundo, City of	2	Medium	US&R-31		90245
I	Montecito FPD	2	Medium			93108
I	Long Beach Fire	2	Medium			90802
I	Santa Barbara City	2	Medium			93101
I	Santa Barbara County	2	Medium			93110
I	Santa Maria City Fire SMR-231	2	Medium	SMR-231		93458
I	Torrance Fire	2	Medium	US&R-96	12/4/2003	90503
I	Long Beach Fire	3	Light			90802
I	Santa Maria City Fire SMR-225	3	Light	SMR-225		93458
I	Santa Maria City Fire SMR-227	3	Light	SMR-227		93458
I	Santa Maria City Fire SMR-229	3	Light	SMR-229		93458
II	Marin County Fire	1	Regional		10/26/2004	94913
II	Alameda County Fire	1	Heavy			94577
II	American Canyon	1	Heavy			94503
II	Fremont City Fire	1	Heavy			94537
II	North County Fire (Monterey Cnty)	1	Heavy	Rescue-5261	2/20/2004	95012
II	San Francisco Fire	2	Medium	Rescue-2	5/27/2004	94107
II	San Rafael Fire	2	Medium			94901
II	San Rafael Fire / PW	2	Medium			94901
II	San Ramon Valley Fire	2	Medium	US&R-34	6/12/2003	94583
II	Saint Helena Fire	3	Light		3/16/2004	94574
II	South San Francisco	3	Light		10/26/2004	94080
III	Chico Fire	2	Medium			95928
IV	Stockton	1	Heavy	Truck-3	5/27/2003	95206
IV	Modesto Fire Rescue-85	2	Medium			95354
IV	Modesto Fire Truck-71	2	Medium			95354
IV	Roseville Fire	2	Medium	Rescue-3	6/10/2003	95661
IV	Sacramento Metro Fire	2	Medium	Rescue-21		95741
IV	Truckee FPD	2	Medium			96160
IV	Donner Sumit FPD	3	Light		Pending	95728
IV	Modesto Fire Truck-75	3	Light			95354
IV	Roseville Fire	3	Light	Truck-1	6/10/2003	95678
IV	Stockton	3	Light	Truck-2		95203
IV	Stockton	3	Light	Truck-4		95207
V	Fresno City Fire	1	Heavy		12/18/2003	93721
V	Clovis Fire	2	Medium			93612
VI	Colton Fire	1	Heavy	Rescue-213	6/27/2003	92324
VI	Rancho Cucamonga FPD	1	Heavy			91729
VI	Riverside City Fire	1	Heavy	Rescue-3		
VI	San Bernardino County Rescue-23	1	Heavy	Rescue-23		92313
VI	San Bernardino County Rescue-91	1	Heavy	Rescue-91		92352
VI	Carlsbad	2	Medium			92008
VI	Chino Valley Fire	2	Medium			
VI	Montclair	2	Medium			91763
VI	Ontario City Fire	2	Medium			91674
VI	San Bernardino City	2	Medium	Rescue-230		92410
VI	San Bernardino County	2	Medium	Rescue-74		92337
VI	29 Palms Fire	3	Light			92277
VI	Center Fire - 29 Palms USMC	3	Light			92278
VI	Big Bear Lake FPD	3	Light	Medic Sqd-281		

Glossary

Cache	A specific collection of specialized tools and equipment corresponding to a US&R operational capability used to perform US&R operations.
Commission	California Seismic Safety Commission
Committee	Urban Search and Rescue Emergency Advisory Committee, created under Government Code Section 8601 (added by Chapter 460, Statutes of 2002 (AB 2002, Alquist)) to advise the Commission.
FEMA	Federal Emergency Management Agency
FIRESCOPE/OES	**FI**refighting **RES**ources of **C**alifornia **O**rganized for **P**otential **E**mergencies): a cooperative association of firefighting agencies that provides technical advice and recommendations to the Director of OES.
Hazardous Material	Any solid, liquid, gas, or mixture thereof that can potentially cause harm to the human body through respiration, ingestion, skin absorption or contact and may pose a substantial threat to life, the environment, or to property.
Hazardous Materials Company	Any piece(s) of equipment having the capabilities, PPE, equipment, and complement of personnel as specified in the Hazardous Materials Company Types and Minimum Standards found in the Field Operations Guide (ICS 420-1).
Hazardous Materials Incident	The uncontrolled release or threat of release of a hazardous material that may affect life, the environment, or property.
OES	Governor's Office of Emergency Services
Operational Area	A delineation of geographical areas as described in the California Master Mutual Aid Agreement. Each county within the State is considered an operational area and is geographically located in one of six Mutual Aid regions.
SEMS	Standardized Emergency Management System

SSC	California Seismic Safety Commission
SF/SAR	Swiftwater Search and Rescue
Search and Rescue Team	An organization established to search and or rescue persons who have become lost or injured in the out of doors or as a result of a natural or man-made disaster. The disciplines include but are not limited to: Tactical search, Technical rescue, Mounted (horses), K9 (Search Dogs), Logistics and Communication. Some teams are currently training to level 4 USAR standards.
Sponsoring Agency	Administration and logistical responsibility for assembly of local US&R team, usually pursuant to a contract with OES and FEMA
State/National US&R Task Force	See entry below "Urban Search and Rescue Team"
Swiftwater Rescue	A subset of technical rescue that involves the use of specially trained personnel, ropes, and mechanical advantage systems often much more robust than those used in rope rescue because of the added pressure of moving water. These rescue operations occur in any body of water other than a swimming pool. They include rivers, creeks, lakes, washes, storm drains or any other body of water.
Technical Rescue	(also known as Urban Search and Rescue, or US&R) The application of special knowledge, skills, and equipment to safely resolve unique or complex rescue situations (examples: confined space rescue, trench rescue, swift water rescue, low-to-high angle rope rescue, structural collapse, mass transportation accident rescue, industrial accident entrapment rescue).
US&R	Urban Search and Rescue
Urban Search and Rescue Team	Any of the following US&R resource types: • US&R Company: a resource comprised of personnel trained to perform search and rescue operations at incidents where technical expertise and equipment are required. US&R Companies include a specific cache of technical rescue equipment and a means of transportation. US&R

Companies are “Typed” based on an identified operational capability – Basic, Light, Medium, or Heavy.

- US&R Crew: a resource comprised of personnel trained to perform search and rescue operations at incidents where technical expertise and equipment are required. US&R Crews are dispatched to incidents without rescue equipment and are used to augment and/or relieve US&R Companies. US&R Crews are “Typed” based on an identified operational capability – Basic, Light, Medium, or Heavy.

- Regional US&R Task Force: a resource comprised of 29 personnel specifically trained and equipped for large or complex Urban Search and Rescue operations. The multi-disciplinary organization provides five functional elements that include Supervision, Search, Rescue, Medical, and Logistics. The Regional Task Force is totally self-sufficient for the first 24 hours. Transportation and logistical support is provided by the sponsoring agency and may be supported by the requesting agency.

- State/National US&R Task Force is comprised of 70 personnel specifically trained and equipped for large or complex Urban Search and Rescue operations. The multi-disciplinary organization provides seven functional elements that include Supervision, Search, Rescue, Haz-Mat, Medical, Logistics and Planning. The State/National US&R Task Force is designed as a “single resource” However, each element of the Task Force is modularized into functional components and can be independently requested and utilized.

Calculations of Training Costs

US&R TRAINING

Category	Training Module	Hours Req'd
	Low Angle Rope Rescue	24
US&R Type 3 (Light)	Rescue Systems 1	40
	Rescue System 2	40
	Trench Rescue	24
US&R Type 2 (Medium)	Technical Rope Rescue	40
US&R Type 1 (Heavy)	Confined Space Rescue	40
	Total Hours for US&R Training	**208 hrs.**

HAZARDOUS MATERIALS TRAINING

Haz Mat Technician	Haz Mat 1A Haz Mat 1B	40 40
	Haz Mat 1C	40
	Haz Mat 1D	40
Haz Mat Specialist	Haz Mat 1F Haz Mat 1G	40 40
Haz Mat WMD	Haz Mat WMD	24
	Total Hours for Haz Mat Training	**264 hrs.**

SWIFTWATER/FLOOD SEARCH & RESCUE (S/F SAR) TRAINING		
S/F SAR Type 4	Swiftwater Rescue Operational	16
	Swiftwater Rescue Technician -1	24
S/F SAR Type 3	Technical Animal Rescue	24
	Swiftwater Rescue Technician Advanced	24
	Technical Rope Rescue	40
	Rescue Boat Handling	16
S/F SAR Type 2 & Type 1	Helicopter Operational	16
Total Hours for Swiftwater/Flood Search & Rescue Training		**160 hrs.**

US&R, HAZARDOUS MATERIALS and SWIFTWATER/FLOOD SEARCH AND RESCUE TRAINING COST ESTIMATES

US&R Course Tuition Costs:

- 6 US&R Courses
- @ 208 hours
- $1,950 per student

Student overtime back-fill costs**:**

- $28.00/hour
- @ 1.5 rate = $42.00/hour
- @ 208 hrs.
- $8,736 overtime back-fill cost per student

Total cost per student: **$10,686**

US&R Type 1 (HEAVY) Company

- 6 personnel in the Company
- 3 personnel deep (18 total positions per Heavy Company)
- @ $10,686 per student

Total Cost per Heavy Company: **$192,348**

Total US&R Training Cost for 18 Type 1 Companies	**$3,462,264**

Hazardous Materials Course Costs:

- 7 Hazardous Materials Courses
- @ 264 hours.

- $4,250 per student

Student overtime back-fill costs:

- $28/hour
- @ 1.5 rate = $42.00/hour
- @ 264 hours
- $11,088 wages and overtime back-fill cost per student

Total cost per student **$15,338**

Hazardous Materials Type 1 (WMD) Company

- 7 personnel in the Company
- 3 persons deep (21 total positions per Haz Mat Type 1 Company)
- @ $15,338 per student

Total Cost per Haz Mat Type 1 (WMD) Company **$322,098**

Total Training Cost for 18 Haz Mat Type 1 (WMD) Companies **$5,797,764.**

Swiftwater/Flood Search & Rescue Course Costs:

- 7 S/F SAR Courses
- @ 160 hours
- $2,350 per student

Student overtime back-fill costs:

- $28/hour
- @ 1.5 rate = $42.00/hour
- @ 160 hours
- $6,720 wages and overtime back-fill cost per student

Total cost per student **$9,070**

S/F SAR Type 1 Team

- 14 personnel in the Team
- 3 persons deep (42 total positions per S/F SAR Type 1 Team)
- @ $9,070 per student

Total Cost per S/F SAR Type 1 Team **$126,980**

Total Training Cost for 18 S/F SAR Type 1 Team **$2,285,640.**

Grand Total for US&R, Haz Mat and S/F SAR Training **$11,545,668**