

# **Tertiary Disaster Response Phase 1**

**Final Report – May 2007**

**Project Number: 2007-SGP-1004**

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## **I. Background**

### **A. Introduction: Disasters and Recovery**

The events of 9/11 and Katrina focused national attention on issues surrounding disaster prevention and response, but as is evident the world continues to be inundated with catastrophic disasters whether man-made through war and terrorism or natural phenomenon such as tidal waves, earthquakes, volcanoes, fires, floods, tornadoes and hurricanes to mention some of the most obvious. Nor are these events new in the relatively short history of human life on planet Earth; events such as Pompeii, the Black Plague, outbreaks of pandemics such as Smallpox and the flu, the San Francisco earthquake or Hurricane Andrew, the devastation of southern Florida or the current loss of over 100,000 people in Myanmar.

The simple point is that catastrophic events are relatively foreseeable, but the question is when and where? The United States as a whole and many states in particular have taken a proactive policy stance focusing on prevention in the case of terrorism and security threats and developed protocols for primary responders such as police and fire. What has become apparent since Katrina and the devastation of New Orleans is the problems of rebuilding communities; their infrastructures, and revitalizing business and commerce. The lesson to be gleaned from New Orleans following the catastrophic occurrences wrought by Katrina is that there is more to disaster response than the initial critical intervention of primary or first responders.

The devastation lashed upon New Orleans by Hurricane Katrina was in many respects, an example of disaster response failures, unqualified leadership, failure to understand the totality of the disaster and poor responses. So instead of alleviating the catastrophic outcomes, the response in many instances increased the suffering. Even more telling years later, many businesses have not returned or reemerged. The failure to effectively or quickly reestablish a viable commercial

activity tends to create a multiplicity of problems impacting cities and communities. In the case of New Orleans, the lack of reemployment of many of the community's citizens created ongoing problems with housing abandonment, movement of skilled workers to other sections of the country and even an exodus of many businesses. The impact on the city is loss of tax revenues, continued turmoil and political upheavals. The question driving this project is where does the Inland Empire stand in regards to tertiary disaster response policies and protocols.

## **B. Introduction: The Inland Empire**

Prior to raising the important issues of this study, a cursory background of the Inland Empire is presented to give an overview of the geographical and logistical focus of this study.

San Bernardino has had a historical connection to transportation from its early beginnings; first as one of the final stops to the Mormon Trail, followed by its development as an important railroad depot. Generally the Inland Empire has historically been agricultural based, with vineyards and later with irrigation, citrus became an increasingly important crop. As urban sprawl moved outward from Los Angeles the Inland Empire with relatively good climate and cheap land became a developer's paradise. The rapid growth in population has made the Inland Empire MSA the 14<sup>th</sup> largest metropolitan area in the United States. The expansion of the freeway system through the Inland Empire, the existence of several railway yards, cheap land, proximity to Los Angeles and the Long Beach/Los Angeles Ports has added another dimension to the Inland Empire—Transportation and distribution hub. In fact, over the last several decades the Inland Empire has emerged as a global distribution center with over 700 million square feet of distribution and warehouses under roof.

It should be noted that the area defined as the Inland empire has greatly varied depending upon who is doing the defining and why. For purposes of this study, the segment of Riverside

and San Bernardino Counties being labeled The Inland Empire is basically a triangular area from San Bernardino to Ontario to Riverside and extending to Yucaipa and Perris. The key features are the distribution and warehouse areas along the I-10, 15, 60, 91 and 215 added to this is the manufacturing, chemical, industrial and commercial activities in this defined area.

## **Study Focus:**

### **C. The Inland Empire and Tertiary Disaster Response**

The response to Hurricane Katrina may well be a worse case example of both primary and tertiary reaction to a catastrophic event. On the other and the practiced response of Floridians to hurricanes may provide a positive example of effective response at three levels: loss prevention, primary and tertiary responders.

The overriding question of this study is: Where does the Inland Empire fit on the scale between effective tertiary response protocols as exemplified by Florida or ineffective tertiary disaster response protocols as evidenced by Katrina and New Orleans? The methodological approach of this study will be as follows: First, an analysis of the tertiary disaster response concept; second, a cursory analysis of the risk of disaster and its impact facing the Inland Empire; third, a summary of the findings; and fourth, a delineation of the recommendations generated by this study.

## **II. Tertiary Disaster Response**

### *Introduction to Tertiary Disaster Response*

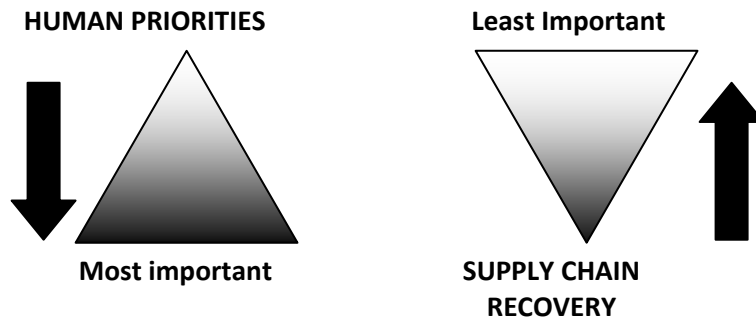
Tertiary Disaster Response (TDR) is a concept developed at Cal State San Bernardino that addresses the systematic restoration of key services in the aftermath of a natural or man-made disaster. It is essentially emergency medicine's triage model applied to a supply chain. The two interrelated elements of TDR are: 1) restoration of the supply chain for essential goods

(food, medical supplies, etc.); and 2) restoration of utilities to key supply chain components. We believe that this is a neglected area of catastrophe mitigation and response and that it could be a potentially volatile public safety issue in the aftermath of a high consequence event in which law enforcement resources would likely be stretched thin with first response responsibilities.

The logic and operationalization of tertiary disaster response systems can be explained with two pyramids, illustrated in figure 1. The first pyramid represents a hierarchy of human needs, perhaps best articulated by Abraham Maslow, who believed that individuals could only move on to higher level psychological needs, such as self-esteem and self actualization once lower level needs, such as safety and physiological needs (food, shelter, clothing) had been reasonably satisfied. In the aftermath of high consequence events (HCE) the segment of the population that was able to focus on the more long term higher level needs suddenly has to confront the immediacy of its lower level needs.

For the segment of the populous already focused primarily on their lower level needs, the HCE exacerbates their anxieties about the future. Tertiary Disaster Response seeks to alleviate the concerns of both groups by focusing on first restoring distribution of services that satisfy lower level needs: grocery and drug stores, water and electricity, and medical supplies before moving on to less critical services, illustrated by the second pyramid.

Figure 1



*The Psychology of Terror & the Sociology of Response*

It is possible to argue that all wars are about ideas and ethics. Historically, wars have been used as a tool to force the victor’s ideas on the vanquished; victory is a proxy for moral superiority. Although often are violated in the course of a conflict, warfare generally has been conducted with at least an eye toward an ethical code. Despite varying levels of deprivation, displacement, and abuse, foremost among these principles has been the separation of combatants and civilians.

While guerilla warfare seeks to avoid direct confrontation with traditional forces, terrorism generally ignores traditional combatants altogether and inflicts pain directly on civilians in a random manner, stripping victims of any ability to prepare for “combat.” The goal of terror attacks is to break the spirit of civilians and in so doing to diminish the legitimacy of social, religious, and governmental institutions to demonstrate the poverty of the victim’s ideologies – propaganda by blood.

Tertiary Disaster Response is designed to accomplish three tasks: 1) provide the materiel to mitigate suffering; 2) maintain confidence in social institutions, thereby heading off anxiety, frustration, and civil disobedience with the accompanying strain on first responders to the initial calamity and; 3) provide information for prevention and preparedness planning. In modern societies, the images distributed by mass media play an important role in fueling or squelching

negative emotions. While the visuals of the work of primary and secondary responders convey the broad human tragedy of a catastrophe, the quiet effectiveness of TDR systems calms *personal* emotions that are driven by lower level needs.

*TDR: Addressing Catastrophe's Socio-Logistical Challenges*

While most Americans know very little about the mechanics of supply chains almost everyone has a preconscious notion that it functions quite well. They drop by the grocery store at their convenience: they are shocked and annoyed if the product they want is not on the shelf. Given the United States' reliable freight transportation system, such high expectations are reasonable. As long as people have confidence in the supply chain they feel no need to stockpile goods. When people become concerned about future supplies, they change their purchasing patterns. The large warehouse stores take advantage of this perception by offering limited quantities of certain 'special purchase' goods. Customers who waffle on a purchase run the risk of the product being unavailable when they return later. Many stores now run special limited quantity sales the day after Christmas and often have long early morning lines for opportunities to get good deals.

If people perceive that the supply chain is breaking down as a result of a High Consequence Event, a panic "run" on stores with basic supplies is likely to ensue. Much like a run on a bank in which depositors have lost faith, a loss of faith in the supply chain for basic items such as food, water, and electricity sets off a negative chain reaction. As table 1 illustrates, the supply chains of grocery stores run with little margin for error. On average of only nine days of inventory.

Table 1  
**Average Days of Inventory**

	<u>1995</u>	<u>2000</u>
Food Retail	11	9
Medical Supplies	38	28
Food Manufacturing	31	19
Household Products	55	38

Although the table indicates that medical supply inventories have decreased substantially in recent years the situation is quite different than in the food supply chain. Hospitals have elaborate contingency plans for “surges” in their patient volume. In the event of an emergency, moving supplies from other facilities to those in the stricken area is relatively easy. Per citizen volume need for product are likely to be quite small and could be accommodated by airfreight. Groceries, on the other hand, move through typically taut supply chains in volumes that can only be handled by truck and/or rail.

Using the Metropolitan Statistical Areas (MSAs) of this consortium’s members, the following three tables illustrate this point, using the metropolitan statistical areas of this point. Table 2 delineates population data. Table 3 starts to develop a “personal supply chain” for citizens in those MSAs. It assumes 1.5 pounds of food per citizen per day with a percentage of the population of infant age, thus the inclusion of disposable diapers. Table 4 converts volumes of product to truckloads (or ocean freight containers in the case of Honolulu). Even in a situation where truck access to an area was severely rationed, the volumes for food and diapers are quite manageable.



Table 2

**Population of Respondent's MSAs<sup>1</sup>**

Albany-Schenectady-Troy NY	841,000
Honolulu HI	903,000
Tampa-St. Petersburg FL-Clearwater FL	2,608,000
Philadelphia-Camden-Wilmington, PA-NJ-DE	5,773,000
Los Angeles-Long Beach-Santa Ana CA	12,829,000
Southern California <sup>2</sup>	16,471,000
New York-Northern New Jersey- Long Island, NY-NJ-PA	18,641,000

Table 3

**Critical Item Volume per Day**

	Water <sup>3</sup> (lbs.)	Food <sup>4</sup> (lbs.)	Diapers <sup>5</sup> (cases)
Albany-Schenectady-Troy NY	14,036,290	1,261,500	114,376
Honolulu HI	15,071,070	1,354,500	122,808
Tampa-St. Petersburg FL- Clearwater FL	34,514,920	3,102,000	281,248
Philadelphia-Camden- Wilmington, PA-NJ-DE	96,351,370	3,102,000	281,248
Los Angeles-Long Beach- Santa Ana CA	214,116,010	19,243,500	1,744,744
Southern California	274,900,990	24,706,500	2,240,056
New York-Northern New Jersey- Long Island, NY-NJ-PA	311,118,290	27,961,500	2,535,176

<sup>1</sup> U.S. Census Bureau, 2003 data

<sup>2</sup> Combined Los Angeles-Long Beach-Santa Ana CA and Riverside-San Bernardino MSAs

<sup>3</sup> 2 gallons per person per day

<sup>4</sup> 1.5 lbs. per person per day

<sup>5</sup> Based on 2000 U.S. population of 282,125,000; 19,218,000 in 0-4 age group, % of total.  
Assumption: 25% of 0-4 age group (1.7%), 8 diapers per child per day.

*Table 4*

**Critical Item Truckloads per Day**

	Water <sup>6</sup>	Food <sup>7</sup>	Diapers <sup>8</sup>	Total
Albany-Schenectady-Troy NY	292	26	32	350
Honolulu HI <sup>9</sup>	499	45	45	589
Tampa-St. Petersburg FL-Clearwater FL	719	65	78	862
Philadelphia-Camden- Wilmington, PA-NJ-DE	2,007	180	218	2,406
Los Angeles-Long Beach-Santa Ana CA	4,461	401	484	5,346
Southern California	5,727	515	622	6,863
New York-Northern New Jersey- Long Island, NY-NJ-PA	6,482	583	703	7,768
	83.4%	7.5%	9.0%	

Water stresses the event response supply chain. The Red Cross recommends planning two gallons of water per person per day – one for drinking and one for other needs. Because water is such a critical element of daily life and because it is such a large stressor on the emergency supply chain it is one of the obvious priorities for TER. This proposal has included two programs to address this critical issue.

*Market Mechanisms, Risk, and Response*

Because they offer some degree of advance notice, hurricanes differ significantly from random events like terrorist attacks or earthquakes. The impact of the market on the supply chain does, however, offer some lessons that are instructive for supply chain restoration.

As a storm becomes a viable threat, citizens begin to alter their personal supply chains. Some board up their windows, thus creating a run on plywood. Some stock up on groceries and

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<sup>6</sup> 5752 gallons per truck 48,000 lbs. per truck; gallons at 8.345 lbs. per gallon, no allowance for bottle weight or pallets

<sup>7</sup> 45,000 lbs. per truck

<sup>8</sup> 171 diapers per case @ 1.38 cubic feet, 3604 cubic feet per 53 foot trailer.

<sup>9</sup> 40 foot high (9'-6") container @ maximum payload of 30,200 lbs. / 2,714 cubic feet

other supplies. Others choose to evacuate the location completely. Taken together, the cumulative effect of these individual actors greatly impacts the business operations of retail outlets and their suppliers. The individual suppliers are making decisions similar to those of consumers: stock out of product, forego reordering until after the danger has passed or restock and stay. The risks for the retailers are the opportunity costs of lost sales versus building inventories that may be damaged in a storm and/or will be difficult to move after the storm.

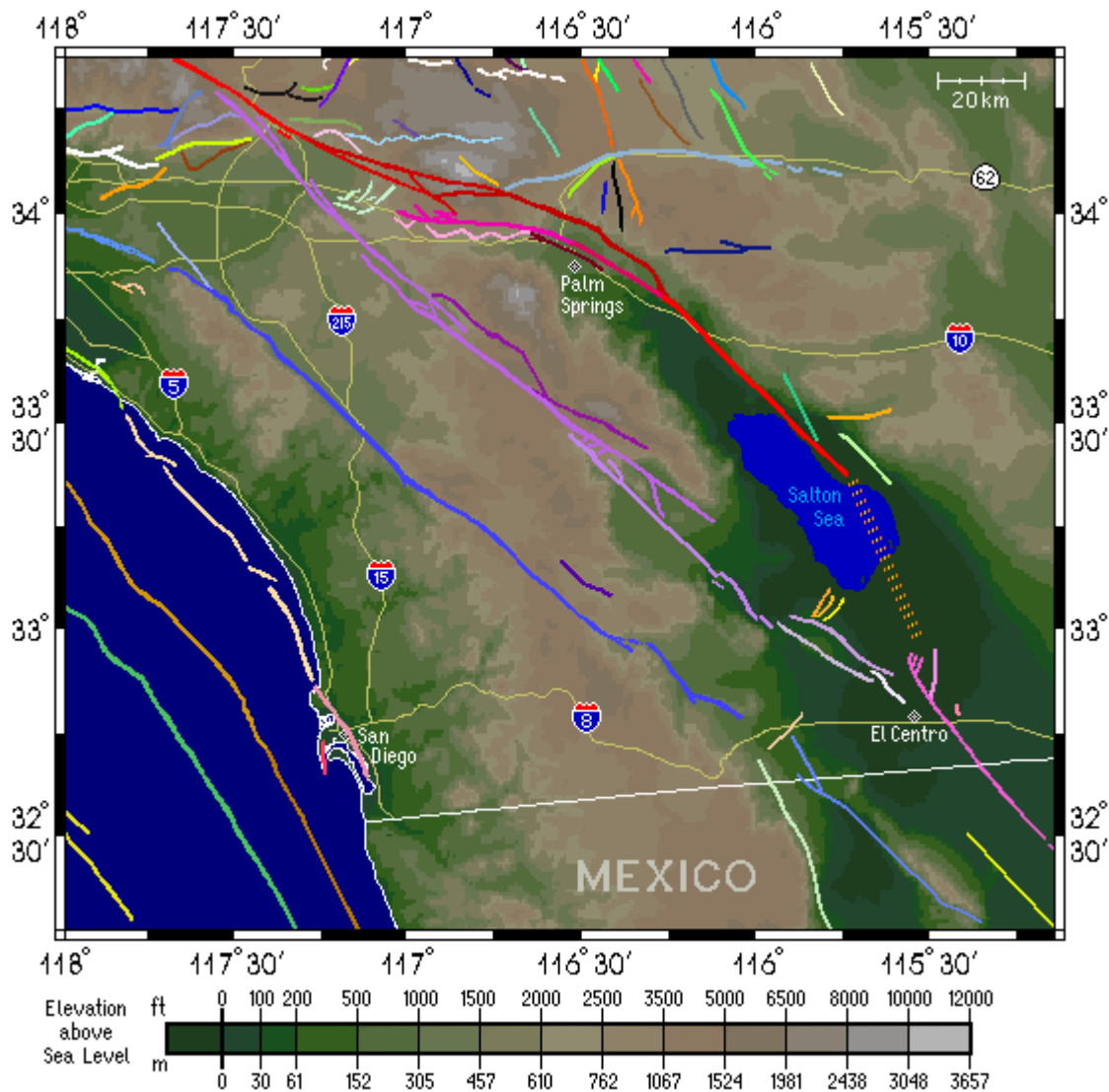
On the transportation side, carriers face four risk elements: 1) losing valuable revenue; 2) stranding equipment during the storm and its aftermath and 3) exposing equipment and personnel to the storm's danger and; 4) incurring the expense of moving equipment empty out of harm's way. As the magnitude of the risks increase, fewer firms will assume the risk. The result will be an increase in the market price for transportation. Once the storm passes and the risk subsides, different market actions will evolve accordingly.

### **III. Disaster Risk Factors Facing the Inland Empire\***

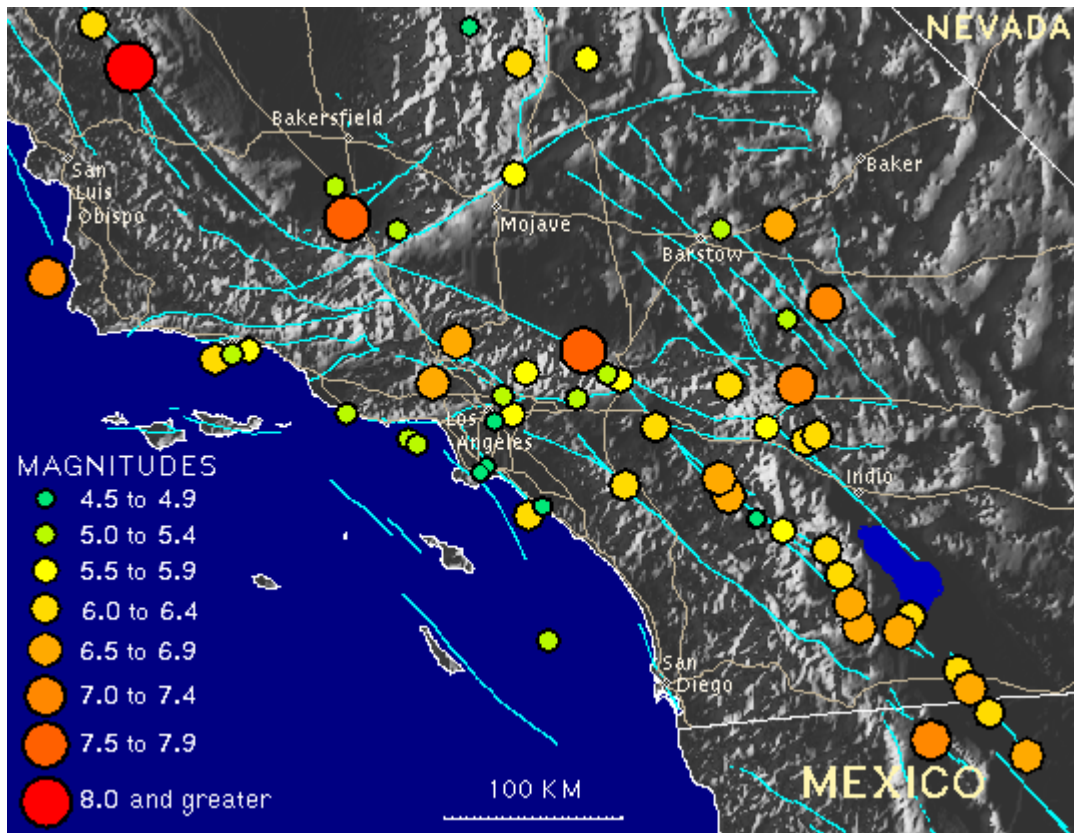
An assessment of risk factors facing the Inland Empire is at best a discussion of probabilities, further adding to the difficulty of assessing the probability of catastrophic occurrences is that they may be natural events and/or human interventions. The difficulty of assessment is exacerbated by the possibility of two or more disastrous events combining. For example, a human intervention with fire during a Santa Anna condition could have dire consequences as could a terrorist act during such a period. The analysis will view several possible catastrophic events facing the Inland Empire.

\*Thanks to Ms. Ilene Allen, CSUSB Graduate Student for preparing substantial portions of this section.

**a. Earthquakes** An earthquake is a shaking or vibration of the ground, it occurs when rocks being deformed suddenly break along a fault. The two blocks of rock on both sides of the fault slip off ground vibrations. This slippage occurs most commonly at plate boundaries. Most earthquakes occur at plate boundaries, the intensely strained zones where plates collide, split apart, or slide past each other. California sits on the meeting place of 2 of tectonic plates: the Pacific Plate and the North American Plate. There are numerous faults throughout southern California, and one major fault in the Inland Empire, that is the San Andreas Fault. Below is a map of the faults in the Inland Empire.



Below is a clickable map of southern California, with epicenters of historic earthquakes (as far back as 1812) of particular note plotted over the background topography. Shown, too, are major highways (in tan) and the surface traces of major faults (in greenish-blue).



This map does **not** show the epicenters of all earthquakes greater than magnitude 4.5 recorded in the southern California area since the 19th century. It is meant as an overview of large and destructive, fairly recent, or unusual earthquakes. The magnitudes given by the scale are generally moment magnitudes (denoted  $M_w$ ), for earthquakes above magnitude 6, and local magnitudes (denoted  $M_L$ ), for most earthquakes below magnitude 6 and for earthquakes which occurred before accurate instrumental measurements of magnitude were possible (*i.e.* before 1933).

Major earthquakes in the Inland Empire:

### **The Cajon Pass Earthquake, 1933**

**TIME** July 22, 1899 / 12:32 pm, PST

**LOCATION** near 34° 15' N, 117° 30' W roughly 24 km (15 miles) northwest of San Bernardino about 65 km (41 miles) ENE of Los Angeles

**MAGNITUDE**  $M_L 5.7$  (?)

**FAULT INVOLVED** uncertain

This quake was reported felt over most of southern California, with intensities reaching VIII or IX on the Rossi Intensity Scale (basically an early version of the Modified Mercalli Scale) in the epicentral area, which was somewhere near Lytle Creek and Cajon Pass. Landslides triggered by the shaking blocked both the Lytle Creek Canyon road and the road through Cajon Pass. The heaviest damage to buildings occurred in San Bernardino, Highland, and Patton. Damage was also reported in Redlands, Pomona, Riverside, Pasadena, and Los Angeles, though it was mostly minor. No deaths were reported, and the number of injuries caused is uncertain.

### **Lake Elsinore Earthquake 1910**

**TIME** May 15, 1910 / 7:47 am PST

**LOCATION** near 33° 45' N, 117° 27' W just northwest of Lake Elsinore about 15 miles (24 km) south of Riverside

**MAGNITUDE**  $M_L 6$

**TYPE OF FAULTING** probably right-lateral strike-slip - ANIMATION

**FAULT INVOLVED** most likely the Elsinore Fault

Preceded by moderate foreshocks on April 10 and May 12, the May 15, 1910, earthquake was not a particularly strong or damaging quake -- though it did topple chimneys in Corona, Temescal, and Wildomar, and caused some alarm among the citizens of Los Angeles and San Diego, as well as those in towns closer to the epicenter. What is notable about this quake is that best estimates place its epicenter as somewhere along the Elsinore Fault Zone, a fault zone along which no other earthquakes as large as or greater than magnitude 6 have been historically recorded. Estimates of the location and magnitude of this quake are by no means precise, but

seem to indicate a quake of roughly magnitude 6, in the vicinity of Temescal Valley, northwest of Lake Elsinore.

### **North San Jacinto Fault Earthquake 1923**

**TIME** July 22, 1923 / 11:28 pm, PST

**LOCATION** 34° 00' N, 117° 15' W 11 km (7 miles) south of San Bernardino about 88 km (55 miles) east of Los Angeles

**MAGNITUDE**  $M_L 6.3$

**TYPE OF FAULTING** right-lateral strike-slip - ANIMATION

**FAULT INVOLVED:** San Jacinto fault

Damage from this quake, which awoke sleepers across southern California, was greatest in San Bernardino and Redlands, though it consisted primarily of minor damage -- chimneys thrown down, broken windows, and the like. Two people were critically injured, but no one was killed. Those buildings which sustained significant damage in the shaking were generally of poor construction. The San Bernardino County Hospital and the Hall of Records were badly damaged. Probably the greatest damage occurred at the State Hospital at Patton, about two miles from the epicenter. Trees fell in the nearby San Bernardino Mountains. In Los Angeles, damage was slight. The shaking was felt as far away as Needles and Santa Barbara.

#### **c. Fire**

The **October 2007 California wildfires** were a series of wildfires that began burning across Southern California on October 20. At least 1,500 homes were destroyed and over 500,000 acres (2,000 km<sup>2</sup>) of land burned from Santa Barbara County to the U.S.–Mexico border. Nine people died as a direct result of the fire; 85 others were injured, including at least 61 firefighters.

California Governor Arnold Schwarzenegger declared a state of emergency in seven California counties where fires were burning. President George W. Bush concurred, and ordered

federal aid to supplement state and local response efforts. Over 6,000 firefighters worked to fight the blazes; they were aided by units of the United States Armed Forces, United States National Guard, almost 3,000 prisoners convicted of non-violent crimes, and 60 firefighters from the Mexican cities of Tijuana and Tecate.

Major contributing factors to the extreme fire conditions were drought in Southern California, hot weather, and unusually strong Santa Ana winds with gusts reaching 85 mph (140 km/h).

The fires had numerous sources. Several were triggered by power lines damaged by the high winds. One fire started when a semi-truck overturned. Another was reported as having been deliberately caused. Causes of the remaining fires remain under investigation. The last fire was fully contained on November 9, 2007, 19 days after the series of fires started.<sup>[221]</sup>

#### **d. Wind**

The **Santa Ana winds** are strong, extremely dry offshore winds that characteristically sweep through in Southern California and northern Baja California in late fall and winter. Temperature-wise, they can range from hot to cold, depending on the prevailing temperatures in the source regions, the Great Basin and upper Mojave Desert.

The winds are also associated with some of the area's largest and deadliest wildfires, including the state's largest fire on record, the Cedar Fire, as well as the Laguna Fire, Old Fire, Esperanza Fire, Great Fire of 1889 and the Witch Fire.

In October 2007 the winds fueled major wild fires and house burnings in Escondido, Malibu, San Marcos, Carlsbad, Rancho Bernardo, Poway, and in the major cities of San Bernardino, San Diego and Los Angeles.

## **Terrorism**



It was not that long ago, a couple of decades at most, that the thought of a terrorist attack, or that the Inland Empire would even be a target was remote and probably unimaginable. However, the Inland Empire is no longer the idyllic rural communities that provided escape from the tensions and hectic pace of Los Angeles. The Inland Empire has changed; it is now a heavily urban area that has become a global logistical hub. It has also become an inland port irreversibly linked to the Ports of Long Beach and Los Angeles. Further, this once agricultural area has blossomed as a railway hub, particularly for the BNSF Railroad. With over 100 trains traversing the Cajon Pass, the BNSF is a major artery for the long haul of goods and materials eastward.

Thus, it would appear that the Inland Empire has emerged as a possible terrorist target that would be exceedingly disruptive of the movement of goods into and out of the United States. As demonstrated in the attacks of 9/11 terrorists do not focus only on destruction of human life, but also the destruction of an economy. Given that almost half the goods entering the U.S. come through to Long Beach/LA Ports and that the Inland Empire has evolved into a global hub its destruction would cause substantial disruption to U.S. commerce.

### **C. Vulnerability and the Inland Empire**

A recent report cited in the Los Angeles Times<sup>10</sup> a study funded by the Homeland Security Department, found that the Los Angeles metropolitan area as a whole was rated as having medium vulnerability. The study focused upon such factors as natural hazards including floods, wildfires, earthquakes, extreme weather, etc., and infrastructure vulnerability consisting of roads, bridges, tunnels, ports, dams, skyscrapers, etc.

This study takes exception to the finding that the Los Angeles MSA and by inclusion, the Inland Empire, is to be classified as having medium vulnerability. Considering that the Inland Empire is nearly a valley with relatively limited channels of ingress and egress, that it is for all

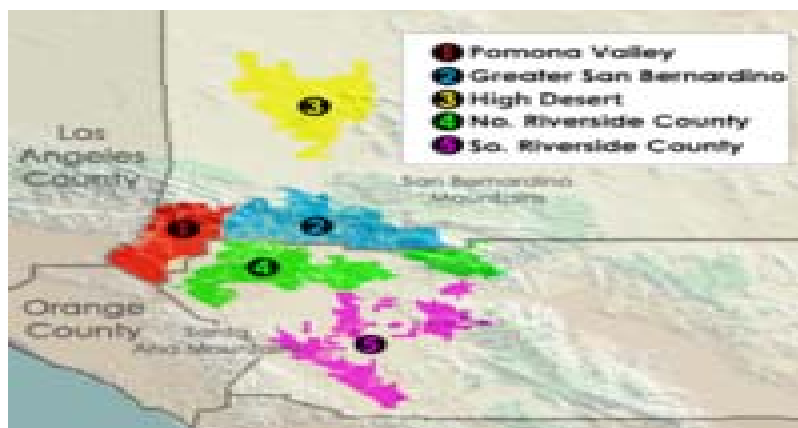
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<sup>10</sup> *Vulnerable to Terror: NYC, New Orleans and...Boise?* By Stuart Glascock, page A8 March 31, 2008.

intents and purposes a desert supplied by outsourced water sources, that almost all basic supplies (food, etc.) come from outside the region. Thus, it appears that given the large population, its center as a global hub, and its precarious dependence upon few and minimally secure supply routes, that the Inland Empire is in fact exceedingly vulnerable to catastrophic occurrence especially where causes may be additive. The focus now turns to how prepared and able is the Inland Empire to restore commercial activities following a catastrophic event.

#### IV. Demographics of The Inland Empire

As mentioned before the Inland Empire is the 14<sup>th</sup> most populated area in the United States. The Inland Empire is a region in Southern California mainly located in Riverside and San Bernardino Counties, and a small portion of the Los Angeles County which includes the cities of Pomona, San Dimas, La Verne, and Claremont which are often included because of their proximity to the Riverside/San Bernardino county line. Furthermore, the name "Inland Empire" was first used in the 1950s to distinguish the region from other communities of the Greater Los Angeles Area, and Los Angeles itself.



Inland Empire Map From Wikipedia

The map illustrates five major zones of the Inland Empire area. The Pomona Valley, Greater San Bernardino, High Desert, North Riverside County, and South Riverside County; moreover, it

fails to illustrate the eastern communities that includes cities such as Palm Springs, Desert Hot Springs, Indio, and Coachella. These communities are located mainly along the Interstate 10 in the Eastern portion of Riverside County, in addition, to other communities in San Bernardino County like Yucca Valley and 29 Palms along highway 62. As the picture shows the Inland Empire expands over a vast topography that ranges from metropolitan areas to mountains, desert, woodlands, etc; which in the case of a major catastrophic event could make it difficult for some communities to be reached or disconnected from the main body of the Inland Empire.

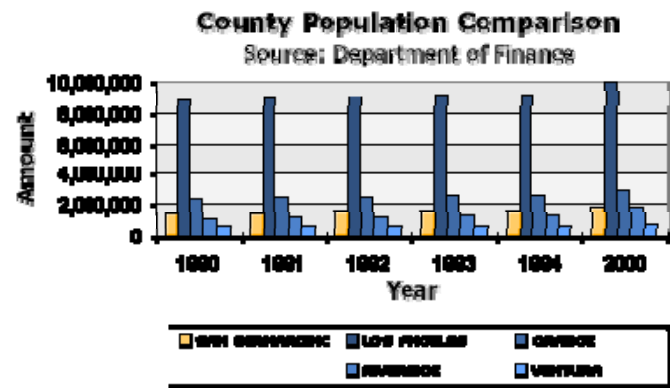
### **Population and Age Distribution**

As previously discussed the Inland Empire area is comprised of the San Bernardino and Riverside Counties. The San Bernardino and Riverside Counties is an area of roughly 27,000 square miles. From 1980-2000 almost 1.3 million people migrated to the region. Since that time the population has doubled, between the 1990 and 2000 census, the population of the combined counties grew from 2,532,780 to 3,254,821. As of a 2007 estimate, the population has grown to a reported 4,081,371 people. That is an estimated 151 people per square mile. Currently the Inland Empire population makes up approximately 11% of California's population. Between these two counties, Riverside is ranked as the 4<sup>th</sup> largest growing County in California, growing an average of 73,393 people within the last four years, San Bernardino County was ranked as the 5<sup>th</sup> largest growing County in California, growing an average of 33, 552 people within the last four years. Together, these counties are considered as the sixth largest growing "state" in the United States. San Bernardino and Riverside counties were also forecasted to have a 38.9% growth rate between 2002 and 2015 having the highest growth rate in the state. What is attracting all these people to the Inland Empire: Lower home prices and the job market.

*General Characteristics of the Inland Empire:* According to the 2000 census ethnicity report; of the 3,254,821 people in the Inland Empire 62% are White, 8% are Black or African American, 1.2% are American Indian and/or Alaskan Native, 4.1% are Asian, and 24.7% are listed as “other.” The age distribution within the San Bernardino and Riverside Counties are: 0 to 14 is 26.5%, 15 to 24 is 14.7%, 25 to 34 is 13.7%, 35 to 44 is 15.8%, 45 to 59 is 15%, 60 to 64 is 3.2%, and 65 and over is 10.7%. Average household size is approximately 3.06. The average family size is just a little higher at 3.53. San Bernardino and Riverside Counties housing units total 1,186,043, of these 1,034,812 being occupied.

**Age Distribution in the Inland Empire:**

	Riverside		San Bernardino	
	Number	Percent	Number	Percent
0 to 14	394,983	25.6 %	465,138	27.3 %
15 to 24	216,099	13.9 %	262,709	15.4 %
25 to 34	204,223	13.2 %	243,028	14.2 %
35 to 44	242,170	15.7 %	272,633	15.9 %
45 to 59	237,902	14.4 %	268,985	15.7 %
60 to 64	54,046	3.5 %	50,482	3.0 %
65 and over	195,964	12.7 %	146,459	8.6 %
<b>Total</b>	<b>1,545,387</b>	<b>100 %</b>	<b>1,709,434</b>	<b>100 %</b>



**V. After the Event**

**A. Distribution Centers**

As mentioned above the Inland Empire has become a major hub for logistics. Hence many major retailers have set up a presence in the Inland Empire with one or more warehouses in the area. Just to mention some: Kmart Distribution Center (DC) is located in Ontario and

Mira Loma, Target DC is located in Fontana ~~and~~ with annexes located in Ontario; Costco DC is located in Mira Loma, Wal-Mart DC is located in Apple Valley with some annex warehouses located in Mira Loma and Ontario. Kohl's DC, Pep Boys' DC, and Mattel's DC are all located in San Bernardino; and in East Riverside, Moreno Valley and Perris are located the Lowes' DC, Walgreens' DC, Ross' DC, Ralph's DC, and McLane, a third party logistics transportation company that distributes groceries to many restaurants and convenience stores. Furthermore, Stater Brothers, one of the largest food and grocery chains in the Inland Empire, have DC's located in Colton, and San Bernardino.

Therefore, being a major hub for distribution makes the Inland Empire a target for terrorism, and it also provides us with an advantage over other locations. New Orleans for example depended on the import of most of their supplies, and did not have enough supplies to affront a disastrous event of such a major category as Katrina. As noted previously in the Metropolitan Statistical Areas (MSAs) tables, many businesses have chosen to carry less inventory in order to save capital. Businesses have been able to do this due to the development of efficient logistics and our transportation infrastructure. Moreover, our current logistics and transportation systems are designed to work with optimal conditions, or at least be able to bear with pre-anticipated issues such as inclement weather. As an example, many Northern States order more supplies before the winter months in order to afford delays in transportation and avoid disruption in their supplies on hand so the customer can find what they want when they need it. Moreover, when we cannot foresee an event like a major earthquake, a terrorist attack, or a premeditated fire in the middle the fire season, we have to be able to react almost immediately, first to reduce the amount of injuries; second, to reassure the chain of command, and third to reestablish our daily activities as near to normal as possible; therefore complying

with the Abraham Maslow pyramids shown before. The Tertiary Disaster Response aims to be prepared for an unexpected event as mentioned before; but it is not limited to a single city or county because a disastrous event could affect the whole region. We must be prepared for a major disruption of the supply chain not just of groceries but services as well like water, cooking gas, gasoline, and electricity. We may even have to be prepared to affront disruption in our transportation systems such as roads and railroads, on which we are dependant for the movement of many of the goods that the United States population consumes.

Currently, about 60% of imported goods coming from overseas pass through the Cajon Pass via Rail or trucks, and if a major earthquake were to disrupt that node in the logistics supply chain it could mean a serious issue not only for the Inland Empire but for the whole country. Because a catastrophic event could render a serious blow to the economy of the U. S.; a plan must be put into place between local governments, State Government, Federal Government, and the private sector. The TDR cannot prevent a catastrophic event but can help us to cope better with such an event.

Finally, we must take advantage of the many distribution centers that we currently have in the area and find out what we have, where we have it, and how can it be distributed to the population in order to mitigate the negative effects that a disaster brings such as chaos, loss of faith in authorities, in the system, and more importantly to minimize the loss of human life. The next section will cover a study that we conducted to find out what the cities know about the distribution centers located in their cities.

## **B. Warehouses**

The Inland Commerce and Security Institute (ICSI) at Cal State San Bernardino conducted a study to find out how many warehouses are located in the Inland Empire in order to

create a data base with a GIS locator allowing us to conduct further studies about what industry is currently supplying the region and Southern California with the most jobs.

We discovered that many cities have no idea what industries have centers in their cities. We were looking for at least a list of buildings, which many cities do not have and some suggested I go and obtain a list of businesses registered in the city however, that does not show the distribution centers, nor the operation of other businesses within each city. That would give us a list of names only ranging from home businesses to industrial warehouses. Some cities just told us to look on the internet for zoning restrictions, which might provide us with some of the information we needed, at least for the location of distribution centers.

One thing was clear; not many cities know what they have within the boundaries of their own cities. Many of the cities sent us to their web sites, especially the big cities such as Fontana, Ontario, etc. However, cities like Apple Valley, Victorville, Hesperia, and Adelanto provided us with a list of warehouses; which will prove to be very helpful information in case of a major event and for the faster recovery after such an event. The TDR uses this information to coordinate the emergency response, allowing the cities or corresponding authorities to move those goods to the sectors where they are needed. Just a reminder, the Tertiary Disaster Response is designed to accomplish three tasks: 1) provide the material to mitigate suffering; some of these materials or supplies are stored in city warehouses as some cities have contingency plans for a disastrous event; however many cities do not have enough supplies to cope with a major catastrophic event if its effects last over a certain period of time. As an example an earthquake could take years to recover from due to the damaged infrastructure; and the supply chain may suffer alterations in delivery times or quantities available; 2) maintain confidence in social institutions, thereby heading off anxiety, frustration, and civil disobedience with the

accompanying strain on first responders to the initial catastrophe. As people feel insecure there is a tendency to project that insecurity onto other people and try to blame someone else for their despair; hence, people that could not satisfy their basic needs of food, shelter, and security may turn against the authorities making the situation worse and; 3) provide information for prevention and preparedness planning. This is the most important part of the TDR because as we share information among the different organizations we can be better prepared to face an emergency. We may not be 100% ready for a catastrophic event but we can be better prepared to cope with any unpredictable event such as an earthquake, terrorist attack, or an act of nature such as a big flood or extreme winds and fire.

Therefore, a list of warehouses paired with a list of supplies that they can provide could be of great importance. If an event leaves the Inland Empire inaccessible, supplies can be shipped within the area. Because we live in a logistics hub we have major distribution centers that can provide us with anything that we may need including food, water, temporary shelter, portable fuel, clothing, construction supplies, generators, etc. See Appendix I which is a list of the findings about the cities and warehouses. This is an initial list with information to contact the different Economic Development Departments and their hours of operation of the different cities.

## **C. Supply Chain**

### **i. Roads**

Roads are a major part of the supply chain infrastructure. Without roads, the movement of goods cannot be attained in the desired time. Modern transportation and logistics depends greatly on the amount of roads and availability of them. As an example when the 1994 San Fernando earthquake hit Southern California, the major damage and most difficult to recover was to the Freeways. Parts of Hwy 14 fell over the I-5 leaving one major connector, to Northern



California, Oregon, and Washington, out of service for several months. This event more than the cost of the damaged infrastructure caused further costs in added time to commuting motorists and delays to truck drivers moving supplies between Southern and Northern California, Oregon, and Washington.

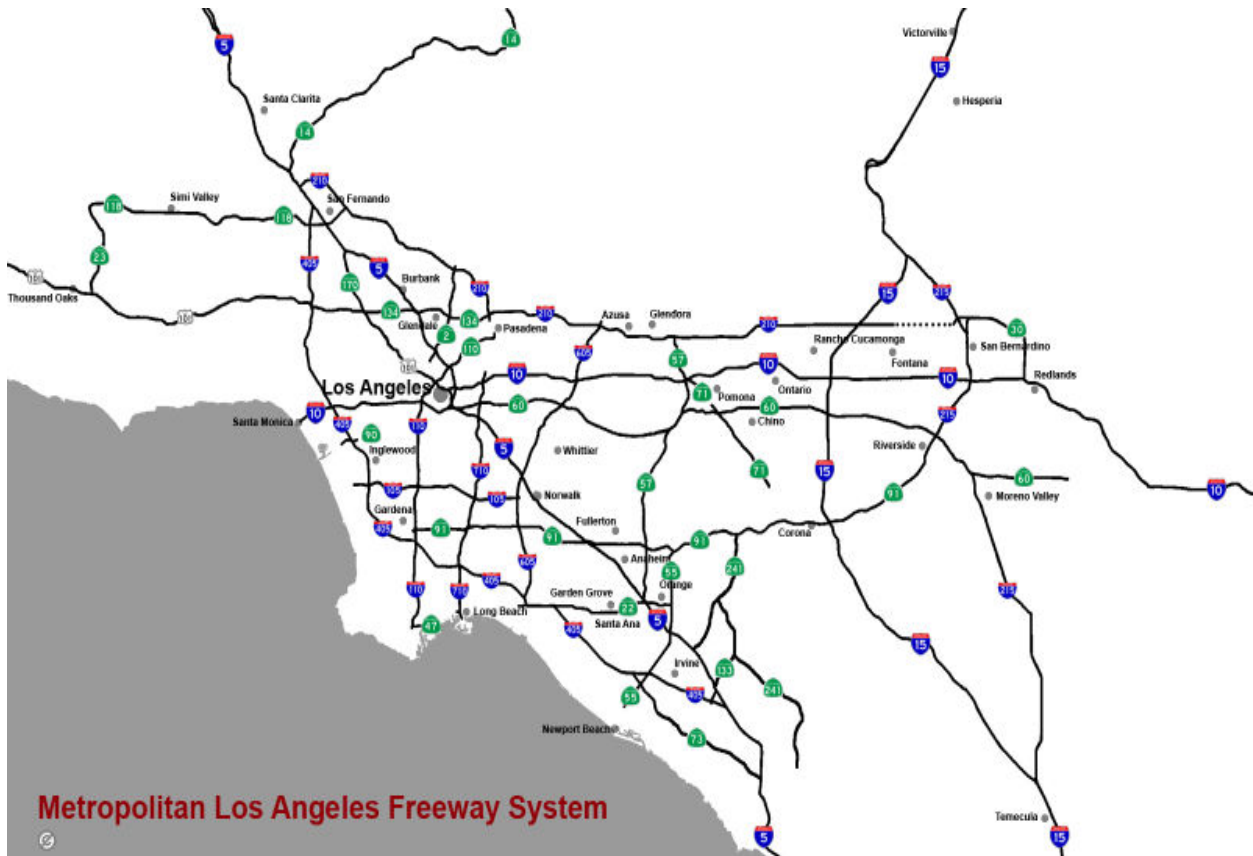
If the Inland Empire faced an event of such magnitude where our major connectors were out of service this could mean a disastrous strike not just for the local economy but for the whole region and in some parts of the U. S. as many goods are imported from the Pacific, stored in the Inland Empire warehouses and redistributed to the rest of the country via the I-10, I-15, I-40 and I-5.

We have in Southern California one of the most efficient freeway systems in the world; the amount of vehicles that travel our highways is impressive. As an example on the I-10 in Riverside, County mile 19.4 which is in Banning, the average daily traffic in April was 97,700 automobiles and 203,436 for the weekend (Saturday and Sunday). In San Bernardino the I-15 Mile 20 which is north of the I-15/ I-215 junction registered the following numbers for April: 97,700 automobiles, average daily traffic, and 295,009 for the weekend (Saturday and Sunday)<sup>11</sup>.

I-15 and the I-10 as you can see in the map below are major access points in and out of Southern California along with U. S. 101 and I-5.

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<sup>11</sup> Caltrans VMT traffic data obtained May 22, 2008



[http://en.wikipedia.org/wiki/Freeway\\_system\\_of\\_Los\\_Angeles](http://en.wikipedia.org/wiki/Freeway_system_of_Los_Angeles)

The map above shows all the freeways that interconnect the greater Los Angeles Metropolitan Area, Orange County, and portions of the Inland Empire. Moreover, it is important for the TDR to know the access to major access routes and highways in and out of the Inland Empire in order to plan for effective movement of goods in case of the blockage of a determined route. Following is a list of the major freeways and highways that connect the Inland Empire:



**91** Riverside Freeway (State Route 91) runs from the I-405 and turns into the I-215 to Barstow. This route connects Orange County with Riverside County, and crosses through Riverside. This is an important route from Riverside to the Refineries in Wilmington, ports of Long Beach and San Pedro, and other distribution centers located in Carson. This freeway has many alternatives previous to the Riverside and Orange County line to access the Inland Empire like the 57 fwy and the 60 fwy or the I-10. In the Santa Ana Canyon this freeway is most vulnerable as not many roads are available to cope in the event of a disaster in this area.



San Bernardino Freeway (Interstate 10) runs from Santa Monica and continues to Florida. This freeway is one of the most important freeways for the transportation of goods through the southern States. This freeway is an important connector between Los Angeles and San Bernardino Counties. This freeway has many alternatives if a disaster should occur along the metropolitan area in the south hwy 60 and to the north I-210, and hwy 30. Moreover if a disaster occurred between Beaumont and Palm Springs we would have no easy alternatives other than using the hwy 62, Hwy 18, and I-15 which could represent delays of four hours with no traffic, but to handle the traffic of the 10 freeway would mean delays of up to eight hours.



Mojave Freeway/Barstow Freeway/Ontario Freeway/Corona Freeway/Temecula Valley Freeway/Escondido Freeway (Interstate 15) is another major hwy that runs from I-5 in San Diego up to Canada. This freeway connects the High Desert with Ontario, Rancho Cucamonga, Corona, Temecula, Escondido, and San Diego. Other than being a route to Las Vegas and Utah, the I-15 connects with I-40, which is a major route to the Midwest and central States. The most vulnerable point for the I-15 for a disaster is in the Cajon Pass as there are no other alternatives other than going to Los Angeles, through hwy 14 and come back through hwy 18, or go through hwy 18, hwy 62 to the I-10. Either of those routes are long and represent major delays in the supply chain.



(State Route 18) The route that goes from Phelan to the San Bernardino Mountains is an important access road from the high desert to Big Bear Lake and from Big Bear Lake to Running Springs.



(State Route 30) is a freeway that connects Highland to San Bernardino and provides an extension to the 210 from San Bernardino.



(State Route 38) is an alternative route to Big Bear that goes from Redlands up to Big Bear and is a less winding road where big trucks can travel to bring goods to the Mountain Communities.



Needles Freeway (Interstate 40) is another important interstate corridor that goes from Barstow California to North Carolina, and can be an alternative for the I-10 in a major disaster to the movement of goods.



Pomona Freeway/Moreno Valley Freeway (State Route 60) is an important route from Los Angeles to Pomona, Ontario, Riverside, Moreno Valley. This is an alternative route to the 10 fwy to access the inland Empire. However, for the communities of Moreno Valley, Perris,

Hemet represents its only access to Riverside and San Bernardino, other than going around through hwy 74, I-15, and hwy 91 to reach Riverside and San Bernardino. Hence, its weakest point is where the 60 joins with I-215 in Riverside.

**62** (State Route 62) this hwy goes from the 10 fwy in Palm Springs to Arizona passing through Yucca Valley and 29 Palms and is an important road for those communities. Its weakest point is at the San Geronio Pass.

**71** Corona Expressway/Chino Valley Freeway (State Route 71) this is a route that connects Pomona and Corona; it goes from the I-10 at the Kellogg interchange to Corona before Green River. This route is mainly used as an alternative for the 57hwy for faster access to Orange County from Chino, Pomona, and Ontario.

**74** (State Route 74) this route goes from San Juan Capistrano in Orange County to Hemet and to Hwy 111 but our concern is the access it can provide as an alternative route for the 60 and 91 freeways to Orange County and Perris/ Moreno Valley.

**79** (State Route 79) an alternative route for the I-15 to San Diego from Temecula or the 215 and 60 fwys for Beaumont/Banning. If a disaster occurred at the I-15 in Rainbow, hwy 79 could be a good alternative for the movement of goods but will provide delays as this is only a two way road.

**83** (State Route 83) better know as Euclid Avenue provides access to Chino for commercial vehicles and a fast access from Ontario to Chino hwy 71 and Orange County.

**86** (State Route 86), **86S** (State Route 86S), and route **III** (State Route 111) are connectors from the Coachella Valley to the Imperial Valley. Each can serve as an alternative to the other as they run along Salton Sea towards Imperial Valley and can provide access to Interstate 8, Arizona, and I-10 after Phoenix.


**138** (State Route 138) is an important route in the high desert that goes from I-5 and connects Palmdale, Lancaster, and crosses I-15 and can access the mountain communities' through Hesperia and ends up in Running Springs.

**142** (State Route 142) one route that can prove useful in case of an emergency either in the 57 fwy or the 91 fwy as this route goes from Chino Hills at the 71 hwy and ends in La Brea at hwy 90 however it is not accessible to commercial traffic.

**210** Foothill Freeway (State Route 210) this fwy goes from Sylmar at the I-5 to San Bernardino where it becomes hwy 30. This route provides access to the foothill communities such as Pasadena, Glendora, La Verne, Rancho Cucamonga, Fontana, Rialto, San Bernardino, and Highland and is an alternative from the highly used freeway 10 route.

**215** Barstow Freeway/San Bernardino Freeway/Moreno Valley Freeway/Escondido Freeway (Interstate 215) this freeway begins in the I-15 in Temecula and ends up in the I-15 at Devore. This fwy is of major importance for travel between Riverside and San Bernardino, and is one of the most transited. It is under construction to increase its width and capacity to be completed in 2013.

**330** (State Route 330) route that goes from Highland to Running Springs, and provides the shortest access to the mountain communities.

 (U.S. Route 395) the route that goes from the I-15 in Hesperia to Canada. This Route goes through the eastern part of the Sierras and is an important route for freight to Northern Nevada, Idaho, Eastern Oregon and Washington.

Knowing the different highways that go through our area can help us to plan and provide for solutions in a catastrophe in advance. Restoring the supply chain can save many more lives, as Katrina proved in New Orleans.

**ii. Bridges**

The previous section shows a great number of roads that interweave the Inland Empire, hence to mention all the bridges in the area would take too much space; in addition, after the 1994 earthquake, many bridges were retrofitted. Furthermore, after the I-35 Minneapolis Bridge Collapse in August 2007; Caltrans conducted a series of structural tests over all the bridges in California. We can rest assured that we have structures that will continue to function in case of a major event. However, Caltrans provides lists with bridges and possible damage.

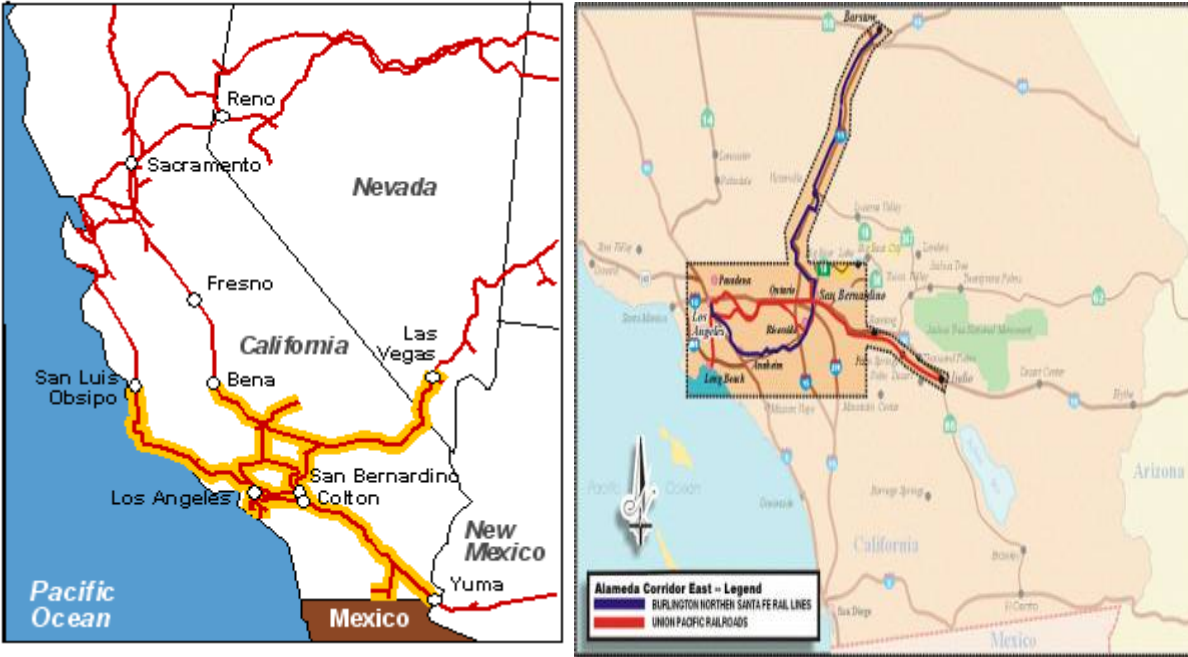
Below is an example that contains a short list of those bridges in the State inventory. All of the bridges on this list have the potential of critical damage. This means that an engineering analysis indicates that in a significant hydraulic event, such as a 100 year flood, there is a probability that the bridge could sustain damage to its foundations that could cause loss of service of the bridge. However, under typical stream-flow conditions, the bridges would not be vulnerable. However, from a TDR point of view, it is better to be aware of a possible critical situation and solve minor issues before it escalates to a major situation.

<b>Bridge ID</b>	<b>Location</b>	<b>Caltrans</b>			
		<b>Zone</b>	<b>County</b>	<b>Fwy/Hwy</b>	<b>Mile</b>
54 0717R, L	CREST WASH	8	SBD	40	18.03
54 1000	COLORADO RIVER WHITEWATER	8	SBD	62	142.6
56 0004R	RIVER MIDDLE FORK SAN	8	RIV	10	27.69
56 0215L	TIMOTEO CREEK	8	RIV	10	5.7

In Appendix II you can see the different lists that were obtained from the Caltrans web site, and explanations; the lists were referent to the whole State of California but we only concentrated on bridges in Caltrans Sector 8 which comprises the Inland Empire for this TDR study.

### **iii. Railroads**

We have two major railroad providers that cross the Inland Empire area, Union Pacific and Burlington Northern Santa Fe (BNSF). These major rail carriers move over 100 trains at the Cajon Pass and move about 60% of the freight that comes to the United States from Asia. BNSF and Union Pacific have rail yards throughout Southern California, being the most important for freight movement for Union Pacific Commerce, Los Angeles, Industry, and Colton. But no yard is equal to another as each yard performs different operations. Commerce is an intermodal yard, which focuses on domestic trailers and import containers from the port going East; Los Angeles is an intermodal yard that handles containers from the ports and domestic trailers going North; Industry is an intermodal yard that focuses in domestic freight only; and Colton is just a rail yard. BNSF has one of the major yards in Southern California. Hubbard located in Commerce, which is an intermodal yard that handles container freight as well as domestic freight trailer that originates in Los Angeles and goes Nationwide; BNSF San Bernardino is a multimodal facility dedicated to the movement of domestic freight. Truck carriers such as JB Hunt, Schneider, Swift, Yellow Freight, and Roadway, use the rail to move their trailers or multimodal containers towards the East or Midwest saving operating cost as rail movement is of lower-cost than moving that trailer with a truck. The following map shows the rail lines that move freight trough Southern California to the rest of the Nation.

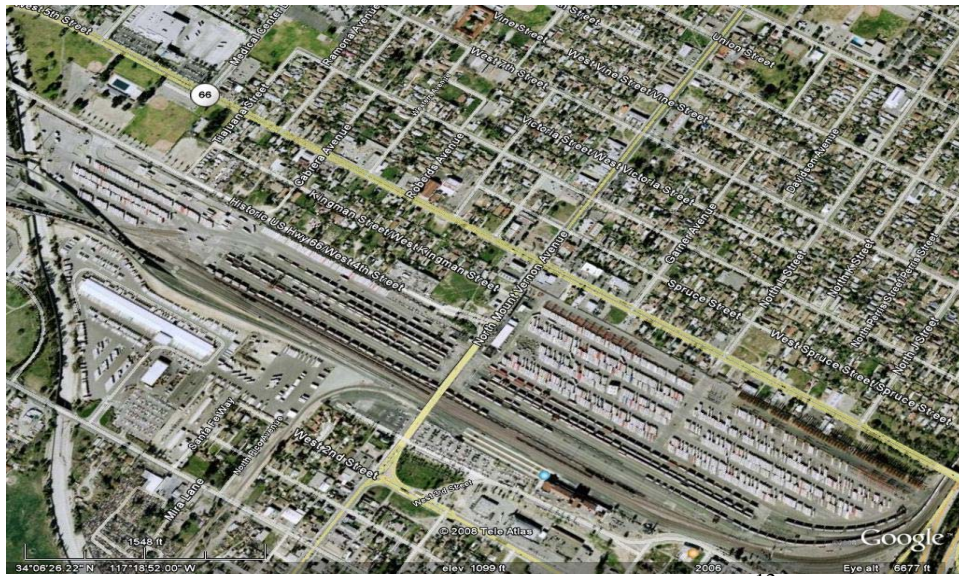


Union Pacific and BNSF Rail Routes through southern California from [www.up.com](http://www.up.com).

For the TDR we have to concentrate on the following points about rail service in the Inland Empire:

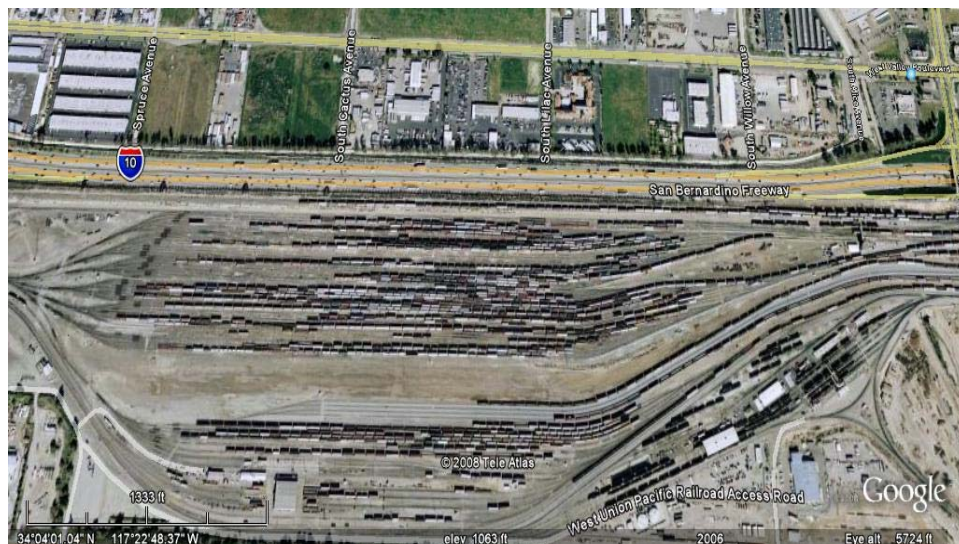
I. San Bernardino multimodal rail yard and Colton Train Yard

The San Bernardino Rail Yard is located in San Bernardino on Fourth Street and provides mostly domestic services to truck companies that move freight from and to the East of the U. S.; this facility is of great importance not just for BNSF but for the Inland Empire and Southern California as trucks do not have to go in and out of Hubbard to drop trailers with destinations out of the area. This yard fits into the logistics hub supply chain model for freight movement in and out of the Inland Empire. Without this yard hundreds of trucks each day may have to travel the already congested freeways in Southern California hence it plays an important role in the Southern California traffic pattern as well.



BNSF San Bernardino intermodal rail yard<sup>12</sup>

It is important to note the difference between a multimodal rail yard and a rail yard; In a multimodal rail yard trailers or containers are loaded into flat bed cars specially designed for the movement of this type of trailer. Both yards use huge spaces but a multimodal yard uses even more as space for trains as well as for the storage of trailers and trucks to park in and out of those spaces.



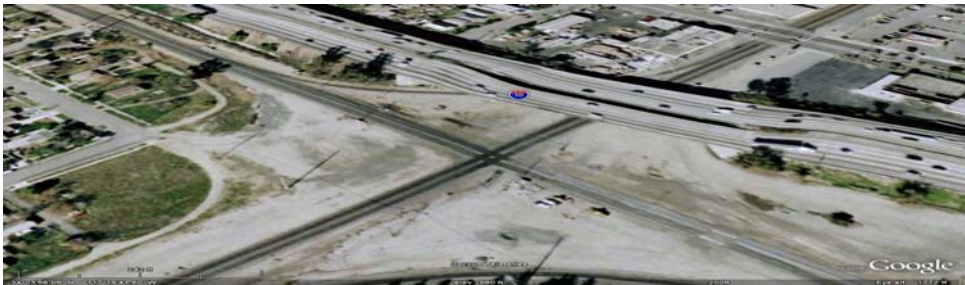
Union Pacific Colton Rail Yard

## II. Colton Crossing

<sup>12</sup> Picture of rail yards, crossing, and Cajon Pass obtained from Google Earth

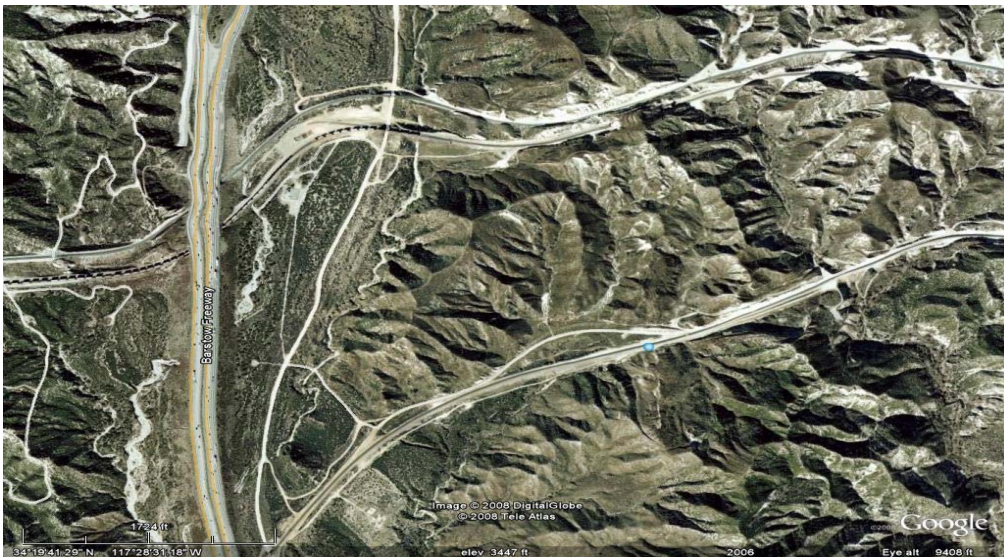
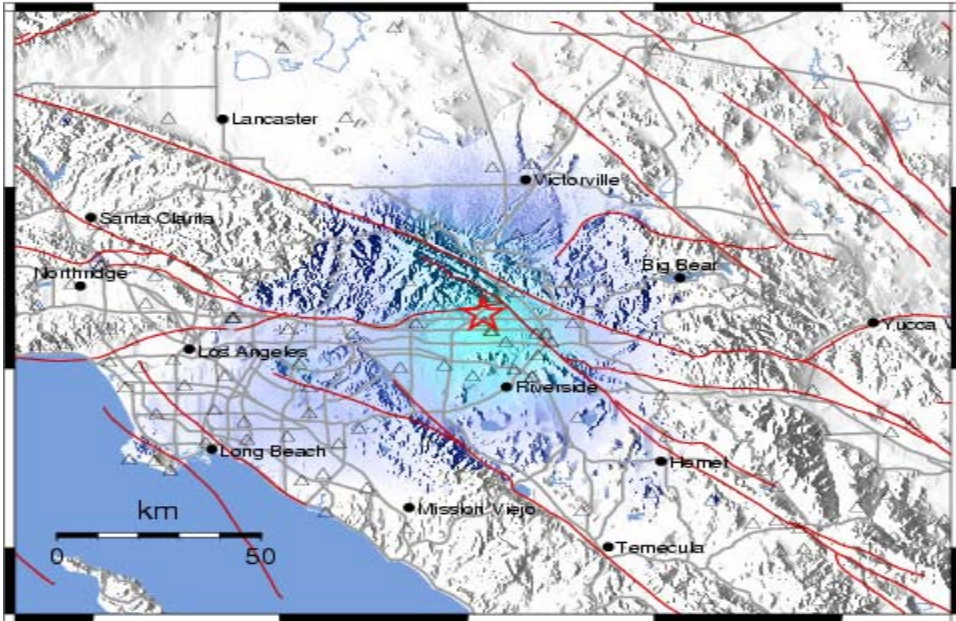


This crossing is of major importance for the freight movement and for the fast recovery of a supply chain in the aftermath of a major catastrophe. This crossing intersects the Union Pacific East-West train movements with the BNSF North-South train movements. In the event of a terrorist attack, or a natural disaster such as an Earthquake that could bring the crossing to a stop, we can see a major disruption in freight movement not just for the Inland Empire or Southern California but for the whole nation. Hence, TDR's focus should be in critical components of our supply chain and this node is of great importance.



### III. Railroad Cajon Pass

The focus of the TDR is to recover fast from a disaster, hence by being prepared in advance we have a far greater chance of surviving and even save lives as we can put alternative plans in motion as we foresee the issues that we may face in a major disaster. The Cajon Pass is an important connector not just for travel between the High Desert and the rest of the Inland Empire, but for freight movement as 60% of imported goods from the Pacific are moved by rail. Over 100 trains move daily through the pass, which is an impressive task by itself. What makes the pass an interesting point is that the San Andreas Fault runs through the Cajon pass as you can see in the following picture. In gray are the major highways or freeways and in red the major faults.



Freeway 15 and the three rail tracks for freight movement by train in the Cajon Pass

The objective of TDR is not to create panic but create awareness about the systems in which we depend and provide contingency plans in advance of a major disaster.

### **Manufacturing**

The Inland Empire does not have many heavy industrial manufacturing centers. As mills like Kaiser Steel leave the area overseas they have not been replaced. However, light industrial activities had flourished. Plastic molding for medicine applications, had flourished in San

<sup>13</sup>[http://geomaps.wr.usgs.gov/socal/geology/inland\\_empire/socal\\_faults.html](http://geomaps.wr.usgs.gov/socal/geology/inland_empire/socal_faults.html)

Bernardino, and Loma Linda, due to the Loma Linda Medical complex. The range of the products varies but it's important for TDR to know the specific location of those manufacturing facilities such as, Nestle Water North America which has production plants in Ontario, and Cabazon. Mission Tortillas has a production plant in Rancho Cucamonga.

### **Infrastructure**

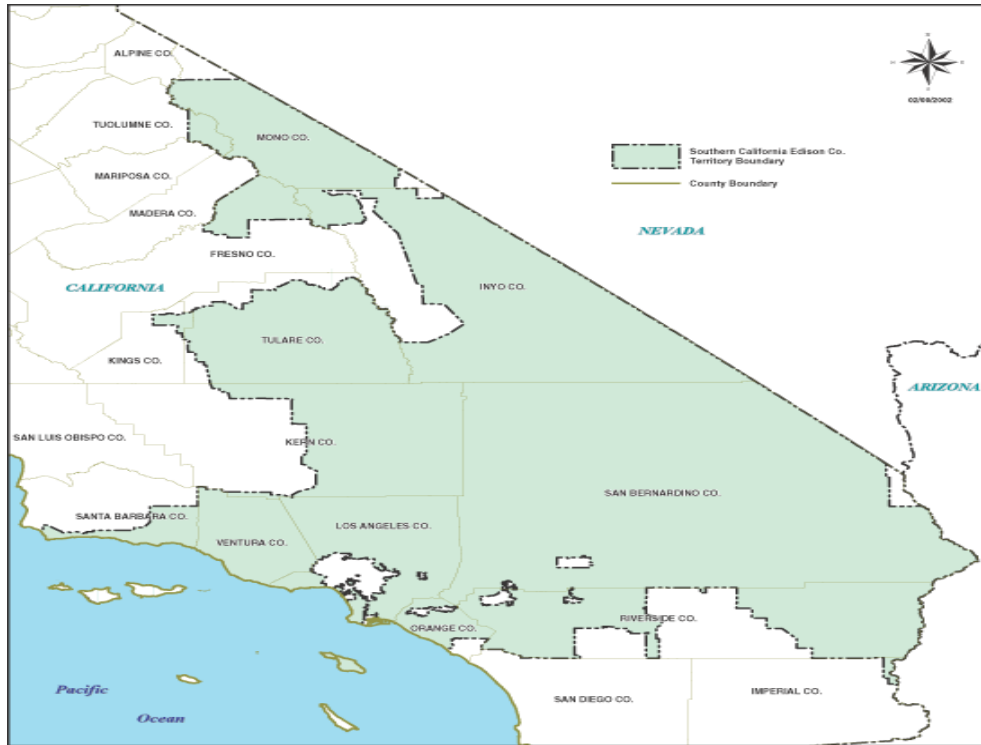
Water:

The Inland Empire Utilities Agency (IEUA) services the largest part of the Inland Empire. It has five locations throughout Rancho Cucamonga, Ontario, Fontana and Chino. It provides water to eight contracting agencies in the cities of: Chino, Chino Hills, Cucamonga Valley Water District, Fontana, Montclair, Ontario, Upland, and Monte Vista Water District. With such a large population that is consistently growing and only 8-12 inches of rainwater a year, local water resources are not sufficient to meet the annual water demands of the Inland Empire. Studies show that the Inland Empire could not exist in its current location form without imported water and an infrastructure to deliver it. The Inland Empire water agencies depend on four sources for their water: the Colorado River, Northern California, local groundwater and treated stream flows, desalted groundwater and treated wastewater in the form of recycled water. The major issue facing the Inland Empire is drought being brought on by development. Supplies of Colorado River water have been reduced to historical levels by federal mandate. Additionally, State Project water and local supplies are subject to unpredictable weather patterns. The Inland Empire's water supplies are brought from out of state or the region and require treatment before consumption. The lack of having its own water resources poses a great threat. In the event of a natural disaster or terrorist attack the Inland Empire would have few, if any, ways to supply the region with clean water.

**Electricity:**

Southern California Edison has been delivering reliable electric service to the central, coastal and southern California regions for over a century. On an average day SCE provides energy to 13 million people in 180 cities that covers 50,000 miles of service area. To deliver the power to residents and businesses it takes 16 utility interconnections, 4,990 transmission and distribution circuits, 425 transmission and distribution crews, and over 15,500 employees. The SCE website offers advice for its customers on how they should respond when a disaster may occur. It offers advice for fires, earthquakes, power outages and evacuations. So far there is no information for terrorist threats or attacks. However, there is no information supplied for what the supplier might do in an emergency. One of the SCE plant managers was questioned what he and his employees would do in the event of an emergency. He stated it was never communicated how they might handle a terrorist attack, but that they would use other disaster training in handling the response. Although most of the SCE energy is pulled from out of state, in the event of a natural or manmade disaster they would be able to get their plants up and running within 24 hours.

Southern California Territory Map:



## Summary and Recommendations

The Inland Empire has witnessed phenomenal growth over the last decades. Cheap land positioned at the intersection of railroads and interstate highways made it an obvious choice for distribution hubs and industrial warehouses. Ultimately the region has become an inland port and global hub with major rail facilities, large airports, and expanding interstate highways. But along with this growth the region becomes a target for possible terrorism in addition to its history of earthquakes, floods and fires. Whatever the source, natural or man-made, or a combination of the two, the Inland Empire is at risk. Fortunately the region appears fairly well prepared for catastrophic events, at least in terms of primary responders. However, in terms of tertiary response and the ability to get businesses and commercial activities up and running, the region is ill prepared in some aspects or not prepared at all. In order to develop protocols and policies for a Tertiary Disaster Response program this study makes the following recommendations:

- Initiate the development and implementation of a business commercial data base;
- Develop a business to business web platform for the Inland Empire to foster communications to and between the region's businesses;
- Commence an Inland Empire intergovernmental consortium designed to discuss and develop commerce support activities following catastrophic occurrences;
- Spearhead a business-government disaster preparedness and recovery workshop/symposium;
- Develop a GIS driven data base that identifies vulnerable and critical elements in the region's supply chain and provide alternate routes to maintain the supply of goods;
- Commence a study focusing on contingency plans for continuance of prioritized supply chain activities;
- Develop a public/private task force focused on Tertiary Disaster Response activities;
- Incorporate TDR analysis into the Universities' transportation centers.

## Appendix I: City Information

City	Contact Economic Development	Email	Telephone/ FAX	Info Available	Web Address	Logistics Information available?	Notes	Business Hours	Warehouses > 70,000 sq foot?
Victorville	Tracy Foster (management Technician)	<a href="mailto:tfoster@ci.victorville.ca.us">tfoster@ci.victorville.ca.us</a>	ph: (760) 241-6425 Fax: (760) 269-0086	Working with the economic development in a possible list of facilities, in their web site have their logistic profile interesting city	<a href="http://ci.victorville.ca.us/city-departments/econ-dev/index.html">http://ci.victorville.ca.us/city-departments/econ-dev/index.html</a>	No	A city willing to participate in the project and very much into the logistics industry	N/A	Yes, Few
Apple Valley	Emily Wong (assistant Director of Economic Development and redevelopment agency)	<a href="mailto:ewong@applevalley.org">ewong@applevalley.org</a>	ph: (760) 240 7000 ext 7900 Fax:(760) 240-7910	They have only 2 warehouses so information is easy to gather	<a href="http://www.applevalley.org/">http://www.applevalley.org/</a>	Yes	Small city willing to participate in the project	N/A	Yes, 2
Barstow	Ron Rector (Economic Development/ Redevelopment Manager)	<a href="mailto:rrector@barstowca.org">rrector@barstowca.org</a>	ph: (760) 255-5106 Fax:(760) 255-9063	the web site has city zoning maps, and useful information for future business, this is a city that offers many incentives to attract businesses	<a href="http://www.barstowca.org/EconDev.asp?ContentID=40&amp;nav=Economic%20Development">http://www.barstowca.org/EconDev.asp?ContentID=40&amp;nav=Economic%20Development</a>	No	A city with great potential for logistics for land and incentives as well it's close to the SCLA	N/A	Unknown
Hesperia	Ted Shove	<a href="mailto:tshove@cityofhesperia.us">tshove@cityofhesperia.us</a>	ph: (760) 947-1002 Fax:(760) 947-1917	Got a list from Ted for building with the characteristics of the project and transportation companies that are in the city	<a href="http://www.ci.hesperia.ca.us/section.cfm?id=19">http://www.ci.hesperia.ca.us/section.cfm?id=19</a>	yes	Small city willing to participate in the project	N/A	Yes, 1
Adelanto	Rick Gomez (interim Community Development Director)	N/A	ph: (760) 246-2300 ext 3028 Fax:(760)246-3406	Got a useful map of projects from their office	<a href="http://207.234.208.13/index.php?option=com_frontpage&amp;Itemid=1">http://207.234.208.13/index.php?option=com_frontpage&amp;Itemid=1</a>	Yes	Small city easy to research in person nothing in their web site about logistics	N/A	Yes, At SCLA

Ontario	Marie Jane Olhasso (Economic Development Director) or Michael Curley (Economic Development Coordinator)	molhasso@ci.ontario.ca.us or mcurley@ci.ontario.ca.us	ph: (909) 395-2197 or (909) 395-2472	Web site provides with a project map that can be useful	http://www.ci.ontario.ca.us/index.cfm/2519	No	Very Interesting city a hub for the logistics industry, a must for this project. however no database available about the buildings dedicated for this purpose.	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 8:00 am to 5:00 pm	Yes, Many
Rancho Cucamonga	Mike Nelson (Economic Development Manager)	<a href="mailto:mnelson@ci.rancho-cucamonga.ca.us">mnelson@ci.rancho-cucamonga.ca.us</a>	ph: (909) 477-2700 Ext 2052 Fax:(909) 477-2848	Web site provides little information, must gather information from zoning and redevelopment agency.	http://www.ci.rancho-cucamonga.ca.us/dept_rda.htm	May get some information from city	Not much room for logistics growth but it's a logistics hub	Monday - Thursday: 7:00 am - 6:00 pm; Fridays closed	Yes, Many
Upland	Jeff Zwack (Redevelopment Director)	<a href="mailto:jzwack@CI.UPLAND.CA.US?subject=Economic/Redevelopment">jzwack@CI.UPLAND.CA.US?subject=Economic/Redevelopment</a>	ph: (909) 931-4300	Has a zoning map that can help for future research	http://www.ci.upland.ca.us/	No	Very populated city, not much room for logistics growth	Monday - Thursday: 8:00 am - 6:00 pm; Fridays closed	Unknown
Montclair	Marilyn J. Staats (Director of Redevelopment /Public Works) or Melinda Flores (Economic Development Coordinator)	mjstaats@ci.montclair.ca.us or mflores@ci.montclair.ca.us	ph: (909) 625-9412 or (909) 625-9417	Has a link to search for available commercial buildings	http://www.ci.montclair.ca.us/depts/redev_agency/economic/default.asp	No	Very populated city, not much room for logistics growth	N/A	Unknown
Claremont	Anthony Witt	N/A	Ph: (909) 399-5464 Fax: (909)399-5366	no Information about logistics	http://www.ci.claremont.ca.us/ps.contact.cfm?ID=1702	No	Very populated city, not much room for logistics growth	8:00 am - 5:00 pm Monday - Friday	Unknown
La Verne	Hal G. Fredericksen	N/A	ph: (909) 596-8706	No information	http://www.ci.la-verne.ca.us/index.php	No	Very populated city, not much room for logistics growth	Monday - Thursday: 8:00 am - 6:00 pm; Fridays closed	Unknown
San Dimas	Larry Stevens (Assistant City manager for Community development)	<a href="mailto:lstevens@ci.san-dimas.ca.us">lstevens@ci.san-dimas.ca.us</a>	ph: (909) 394-6250	Not much information about logistics	http://www.cit.yofsandimas.com/redevelopment.cfm	No	No much space for logistics growth	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 8:00 am to 5:00 pm	Unknown



Pomona	N/A	N/A	ph: (909) 620-2410	GIS map, useful for zoning and further research	<a href="http://www.ci.pomona.ca.us/city_departments/redevelopment_agency/business_development.php">http://www.ci.pomona.ca.us/city_departments/redevelopment_agency/business_development.php</a>	No	Not much information in their web site have to do personal research, but no seem a promising city, may have few buildings for our project	Monday - Thursday: 8:00 am - 6:00 pm; Friday 8:00 am - 5:00 pm	Yes
Chino	Earl Nelson (Redevelopment/Economic development)	<a href="mailto:redvelopment@cityofchino.org">redvelopment@cityofchino.org</a>	ph: (909) 590-5500 Fax:(909) 464-0777	Some useful information	<a href="http://www.cityofchino.org/depts/redev/default.asp">http://www.cityofchino.org/depts/redev/default.asp</a>	No	A city that has switched from agricultural to a logistics hub, have to go a gather further information.	Monday- Friday 7:30 am - 5:30 pm	Yes, Many
Chino Hills	N/A	N/A	ph: (951) 364-2740 Fax:(951)364-2795	No Information	<a href="http://www.chinohills.org/index.asp?NID=126">http://www.chinohills.org/index.asp?NID=126</a>	No	Apparently this city is focused on attracting retail business, so I don't know if they have warehouses in their city.	Monday, Wednesdays, and Fridays from 7:30am - 3:30 pm Tuesdays from 7:30am - 7:00 pm	Yes, Few
Norco	Brian Dulman (Economic Development Director)	<a href="mailto:boulman@ci.norco.ca.us">boulman@ci.norco.ca.us</a>	ph: (951) 270-5645	No information	<a href="http://www.ci.norco.ca.us/depts/community_development/default.asp">http://www.ci.norco.ca.us/depts/community_development/default.asp</a>	No	Small city easy to research in person nothing in their web site about logistics	N/A	Unknown
Corona	N/A	<a href="mailto:Redevelopment@ci.corona.ca.us">Redevelopment@ci.corona.ca.us</a>	Ph: (951) 736-2260	Provides an interactive map that gives transportation routes for trucks, and provide for some information about the warehousing areas	<a href="http://www.ci.corona.ca.us/?section=City%20Departments&amp;page=Redevelopment">http://www.ci.corona.ca.us/?section=City%20Departments&amp;page=Redevelopment</a>	No	Have Some industrial zones were mayor warehouses are located, but nothing mentioned in the web site, must go there personally	8:00 am - 5:00 pm Monday - Friday	Yes, Many
Lake Elsinore	N/A	N/A	ph: (951) 671-3174 Fax:(951)674-2392	scarce information	<a href="http://www.lake-elsinore.org/economicupdate.asp">http://www.lake-elsinore.org/economicupdate.asp</a>	No	Room for growth	Monday - Thursday, 8:00 am to 5:00 pm; Friday: 8:00 am to 4:00 pm	Yes
Murrieta	Simone McFarland	<a href="mailto:smcfarland@murrieta.org">smcfarland@murrieta.org</a>	ph:(951) 461-6012	some information	<a href="http://www.murrieta.org/ecdev/index.asp">http://www.murrieta.org/ecdev/index.asp</a>	No	Interesting information and looking to expand its business	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 8:00 am to 5:00 pm	Unknown

Temecula	N/A	N/A	ph: (951) 694-6418	No information about logistics	<a href="http://www.cityoftemecula.org/Temecula/Government/EconomicDevelopment.htm">http://www.cityoftemecula.org/Temecula/Government/EconomicDevelopment.htm</a>	No	Interesting city has some warehouses. must visit to obtain the complete zoning areas	8:00 am - 5:00 pm Monday - Friday	Yes
Perris	Michael McDermott	N/A	ph: (951) 943-6100 ext 277 Fax:(951)443-1768	No information on their web site	<a href="http://www.cityofperris.org/economic-development/">http://www.cityofperris.org/economic-development/</a>	No	Currently growing in the logistics industry, need to go to the city and gather more research	N/A	Yes, Many
Moreno Valley	N/A	N/A	ph: (951) 413-3460	Interesting plans and a map of future developments	<a href="http://www.ci-moreno-valley.ca.us/development.biz/new-development.shtml">http://www.ci-moreno-valley.ca.us/development.biz/new-development.shtml</a>	No	Need more information about existing warehouses, map in the site would be useful	N/A	Yes
Riverside (city)	N/A	devdept@riversideca.gov	ph: (951) 826-5649	Some interesting information in their web site	<a href="http://www.riversideca.gov/">http://www.riversideca.gov/</a>	some partial information	Need to visit the commercial designed zones to create a map and obtain addresses of business for further investigation	Monday - Friday 7am to 7pm	Yes
Riverside (county)	N/A	N/A	Ph: (951) 955-8916 Fax:(951)955-9495	Site provides useful information for building search (new buildings)	<a href="http://www.rivcoeda.org/">http://www.rivcoeda.org/</a>	No information about existing warehouses or business in the logistics	Need to go to the County and talk to someone in order to get a list of locations, or cities to gather further information	8:00 am - 5:00 pm Monday - Friday	Yes, Many
Fontana	Elisa J. Grey (Economic Development Manager) and John C. Perez (administrative assistant)	egrey@fontana.org and jperez@fontana.org	ph: (909) 350-6741 Fax:(909)3506610	Not much information about logistics in their web site	<a href="http://www.fontana.org/index.htm">http://www.fontana.org/index.htm</a>	No	Need to go back and talk with the ED department for future plans, also, to obtain a list of areas where logistics are concentrated	Monday to Thursday from 8:00 am to 6:00 pm Closed Fridays	Yes, Many
San Bernardino (city)	N/A	<a href="mailto:info@sbrda.org">info@sbrda.org</a>	ph: (909) 663-1044 Fax:(909)888-9413	Not Much, only plans but need more investigation	<a href="http://www.ci-san-bernardino.ca.us/">http://www.ci-san-bernardino.ca.us/</a>	No	Need to personally go and obtain further information	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 7:30 am to 4:30 pm	Yes

San Bernardino (county)	Steve Harrington (Business Development Manager)	<a href="mailto:sharrington@d.svcounty.gov">sharrington@d.svcounty.gov</a>	ph: (909) 3874700-4210 Fax:(909)388-4210	Need to go back to SB county and obtain further information	<a href="http://www.co.san-bernardino.ca.us/">http://www.co.san-bernardino.ca.us/</a>	not in their web site	Must Talk to Steve about developments, plans, and zoning to visit those Zones and map the logistics areas of interest	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 7:30 am to 4:30 pm	Yes
Colton	N/A	<a href="mailto:rda@coltonrda.com">rda@coltonrda.com</a>	ph: (909) 370-5167 Fax:(909)370-5196	Not much information about logistics	<a href="http://www.ci.colton.ca.us/">http://www.ci.colton.ca.us/</a>	No	not much information in this site, need to gather information from other sources	Monday to Thursday from 7:00 am to 6:00 pm Closed Fridays	Yes
Rialto	Greg Lantz (Development Manager), and Robb Steel (Redevelopment Director)	<a href="mailto:Rsteel@rialto.ca.gov">Rsteel@rialto.ca.gov</a> and <a href="mailto:Glantz@rialto.ca.gov">Glantz@rialto.ca.gov</a>	Ph: (909) 879-1140 Fax:(909)875-5467	Interesting plans and land for logistics expansion	<a href="http://www.ci.rialto.ca.us/">http://www.ci.rialto.ca.us/</a>	No	Informative site, and interesting plans	N/A	Yes
Grand Terrace	Steve Berry (assistant city manager)	<a href="mailto:sberry@cityofgrandterrace.org?Subject=EconomicDevelopment">sberry@cityofgrandterrace.org?Subject=EconomicDevelopment</a>	(909) 430-2226	Some plans for logistics	<a href="http://www.cityofgrandterrace.org/">http://www.cityofgrandterrace.org/</a>	No	space available for logistics growth and good location	N/A	Yes
Loma Linda	Dennis Halloway (City Manager)	<a href="mailto:dhalloway@lomalinda-ca.gov">dhalloway@lomalinda-ca.gov</a>	ph: (909) 799-2810	No information about logistics, wants to attract other type of businesses	<a href="http://www.ci.loma-linda.ca.us/">http://www.ci.loma-linda.ca.us/</a>	No	No much space for logistics growth	Monday - Thursday, 7:00 am to 5:30 pm; Friday: Closed	unknown
Highland	N/A	N/A	ph:(909) 864-6861	Some useful information	<a href="http://www.ci.highland.ca.us/">http://www.ci.highland.ca.us/</a>	No	Interesting information about logistics plans and a map	Monday - Thursday, 7:30 am to 5:30 pm; Friday: Closed	Unknown
Redlands	Jeffrey L. Shaw (Community Development Director) and Steven H. Dukett, Interim Redevelopment Director	N/A	ph: (909) 335-4755	Some useful information	<a href="http://www.ci.redlands.ca.us/index.php">http://www.ci.redlands.ca.us/index.php</a>	No	Good information	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 8:00 am to 5:00 pm (close alternate Fridays)	Unknown
Yucaipa	N/A	N/A	ph: (909) 797-2489 Fax:(909)790-9203	No information available for logistics	<a href="http://www.yucaipa.org/index.php">http://www.yucaipa.org/index.php</a>	No	not much information and difficult to navigate the site also no Economic development department there is a community development but is not useful for our project	Monday - Thursday, 7:30 am to 5:30 pm; Friday: 8:00 am to 5:00 pm (close alternate Fridays)	Unknown

Beaumont	David Dillon (economic development director)	N/A	ph: (951) 769-8520 Fax:(951)769-8526	No information available about plans	<a href="http://www.ci.beaumont.ca.us/index.asp">http://www.ci.beaumont.ca.us/index.asp</a>	No	not much information and difficult to navigate the site	N/A	Unknown
Banning	Oscar Orci (Director Community Planning)	<a href="mailto:oorci@ci.banning.ca.us">oorci@ci.banning.ca.us</a>	ph: (951) 922 3125 Fax:(951) 922-3128	Planning map, Zoning Restrictions. Room for growth, but no economic development department	<a href="http://www.ci.banning.ca.us/index.asp">http://www.ci.banning.ca.us/index.asp</a>	No	Difficult to navigate and obtain information	8:00 am - 5:00 pm Monday - Friday	Unknown
Hemet	N/A	<a href="http://www.cityofhemet.org/forms/ed_email.htm">http://www.cityofhemet.org/forms/ed_email.htm</a>	ph: (951) 765-2308 Fax:(951)765-3785	The space reserved for Economic development is full of information some for our purposes, also provide link for other economic development organizations of the area, however there is no contact names for economic development	<a href="http://www.cityofhemet.org/index.htm">http://www.cityofhemet.org/index.htm</a>	Not much, only plans	Easy site to navigate has some information but lacks important information about contacts	8:00 am - 5:00 pm Monday - Friday	Unknown
Coachella	Lorie Williams, (Economic Development Manager), and Oriana Hoffert, (Administrative Assistant)	<a href="mailto:lwilliams@coachella.org">lwilliams@coachella.org</a> and <a href="mailto:ohoffert@coachella.org">ohoffert@coachella.org</a>	<a href="tel:(760)398-3502">Ph: (760) 398-3502 /</a> <a href="tel:(760)398-8117">Fax: (760) 398-8117</a>	Real State listings. Large Empty Lots. Room for logistics growth	<a href="http://www.coachella.org/index.asp">http://www.coachella.org/index.asp</a>	No, buy talk about it in their web site	Easy Site to navigate and to gather information but not much information available about logistics	8:00 am - 5:00 pm Monday - Friday	Unknown
Indio	Mariano Aguirre (Development Manager) and Karen Hawkesworth Economic Development Specialist)	<a href="mailto:maguirre@indio.org">maguirre@indio.org</a> and <a href="mailto:khawkesworth@indio.org">khawkesworth@indio.org</a>	ph: (760)391-4120 fax:(760)391-4027	GIS planner for development, Marketing plan, space for logistics growth	<a href="http://www.indio.org/">http://www.indio.org/</a>	No	Easy Site to navigate and to gather information but not much information available about logistics	8:00 am - 5:00 pm Monday - Friday	Unknown
Desert Hot Springs	Steven Mendoza (Community Development Director) and Kristie Ramos (Administrative Assistant)	None in Web site	Ph: (760) 329-6411 ext 240 and 260 Fax:(760)251-6857	List of projects, map of projects, Statistics, room for logistics growth.	<a href="http://www.desert-hot-springs.us/">http://www.desert-hot-springs.us/</a>	No, only projects	Easy Site to navigate and to gather information, but not much information available	N/A	yes

## Appendix II: Bridges:

### 08/03/07 CALIFORNIA STATE BRIDGE INVENTORY (Inland Empire Bridges)

Caltrans Bridge Number	Bridge Name	Caltrans District	County	Hwy/Fwy	Mile number	Reason for designation
54 0015	HATHAWAY CREEK	8	SBD	38	26.58	Deck
54 0270L	OAT DITCH	8	SBD	15	130.58	Substructure
54 0270R	OAT DITCH	8	SBD	15	130.59	Substructure
54 0292G	SANTA ANA RIVER (EB-10 TO N/215) BIG BEAR LAKE DAM BRIDGE	8	SBD	10	23.8	Deck
54 0310	BRIDGE	8	SBD	18	44.33	Deck
54 0315L	WHEATON SPRINGS WASH HALLORAN SPRINGS ROAD OC	8	SBD	15	174.7	Deck
54 0338	OC	8	SBD	15	149.6	Deck
54 0422	LYTLE CREEK	8	SBD	30	20.76	Deck
54 0438R	CUCAMONGA WASH	8	SBD	10	6.7	Deck
54 0467	HIGHLAND AVENUE OC REDLANDS LOOP	8	SBD	215	9.36	Deck
54 0489	OVERHEAD	8	SBD	215	6.59	Deck
54 0492R	N215/4TH ST-S215 OC ROUTE 66/N215 SEPARATION	8	SBD	215	7.02	Deck
54 0493	SEPARATION	8	SBD	66	23.08	Deck
54 0494C	S215-6TH ST/N215 OC	8	SBD	215	7.33	Deck
54 0498	BASELINE STREET OC	8	SBD	215	8.08	Deck
54 0527	IOWA AVENUE OC	8	SBD	215	0.4	Deck
54 0530	WASHINGTON AVENUE OC COLTON AND NEW YORK AVENUE	8	SBD	215	2.69	Deck
54 0591	AVENUE	8	SBD	10	30.1	Deck
54 0620L	CENDA DITCH	8	SBD	15	172.11	Deck
54 0621L	WHEATON WASH	8	SBD	15	173.84	Deck
54 0665G	N15-N395 CONNECTOR OC	8	SBD	15	31.81	Deck
54 0704R	FOX WASH	8	SBD	40	139.82	Deck
54 0742	EAST END AVENUE UC	8	SBD	60	0.29	Deck
54 0750	SAN ANTONIO AVENUE UC	8	SBD	60	4.1	Deck
54 0759L	BISMARCK WASH	8	SBD	40	57.61	Substructure
54 0766	ARROWHEAD AVENUE OC	8	SBD	30	23.59	Deck
54 0770	ROUTE 18/30 SEPARATION	8	SBD	18	6.16	Deck
54 0781L	CAJON CREEK	8	SBD	15	16.07	Deck
54 0810	SHEEP CREEK	8	SBD	138	3.62	Deck
54 0824F	S215-E10 CONNECTOR	8	SBD	215	4.02	Deck
54 0849L	ORANGE BLOSSOM WASH	8	SBD	40	71.75	Deck
54 0852R	GRANITE MOUNTAIN WASH	8	SBD	40	76.5	Deck
54 0853L	SPRINGS WASH			40	77.39	Deck

54 0853L	WILLOW SPRINGS WASH	8	SBD	40	77.37	Deck
54 0886L	MARBLE WASH	8	SBD	40	80.42	Superstructure
54 0886R	MARBLE WASH	8	SBD	40	80.44	Superstructure
54 0887L	FORTRESS WASH	8	SBD	40	90.53	Superstructure
54 0887R	FORTRESS WASH	8	SBD	40	90.52	Superstructure
54 0888L	NEPRUD WASH	8	SBD	40	91.64	Superstructure
54 0888R	NEPRUD WASH	8	SBD	40	91.66	Superstructure
54 0890L	MACDONALD WASH	8	SBD	40	94.37	Superstructure
54 0890R	MACDONALD WASH	8	SBD	40	97.14	Superstructure
54 0892L	CHUCKWALLA WASH	8	SBD	40	97.14	Superstructure
54 0892R	CHUCKWALLA WASH	8	SBD	40	97.62	Superstructure
54 0893L	MUSTANG WASH	8	SBD	40	97.62	Superstructure
54 0893R	MUSTANG WASH	8	SBD	40	2.37	Deck
54 0908G	N15-W10 CONNECTOR OC	8	SBD	40	2.41	Deck
54 0910F	S15-E10 CONNECTOR OC	8	SBD	40	9.98	Deck
54 0914F	W10-S15 CONNECTOR OC	8	SBD	15	2.37	Deck
54 1000	COLORADO RIVER	8	SBD	15	2.41	Substructure
54 1065F	W10-S15 CONNECTOR OC	8	SBD	10	9.92	Deck
54 1091L	IRON WASH	8	SBD	58	20.64	Deck
54 1204L	HOT WASH	8	SBD	15	160.67	Deck
54 1204R	HOT WASH	8	SBD	15	160.67	Deck
54 1205L	WEST VALLEY WELLS DITCH	8	SBD	15	160.94	Deck
54 1206R	VALLEY WELLS DITCH	8	SBD	15	161.5	Deck
54 1207L	WINDMILL STATION DITCH	8	SBD	15	162.19	Deck
54 1207R	WINDMILL STATION DITCH	8	SBD	15	162.19	Deck
54 1208L	WELLS DITCH	8	SBD	15	162.47	Deck
54 1269L	KALI DITCH	8	SBD	15	154.67	Deck
56 0003	SAN GORGONIO WASH	8	RIV	10	16.14	Deck
56 0008	COLORADO RIVER	8	RIV	10	156.38	Deck
56 0141	LOWEN DITCH	8	RIV	86	3.08	Deck
56 0150L	COPHY DITCH	8	RIV	86	1.38	Deck
56 0175L	ETHANAC OH & ROUTE 74	8	RIV	215	23.51	Deck
56 0175R	ETHANAC OH & ROUTE 74	8	RIV	215	23.51	Deck
56 0201L	SMOKY GULCH	8	RIV	10	63.65	Deck
56 0236	SALTON CREEK	8	RIV	111	1.51	Deck
56 0272R	WARM SPRINGS CREEK	8	RIV	15	7.78	Substructure
56 0286	PALM DITCH	8	RIV	111	8.65	Culvert
56 0323	ROUTE 10/243 SEPARATION	8	RIV	10	12.85	Deck
56 0324	HARGRAVE STREET UC	8	RIV	10	13.86	Deck
56 0330	ARLINGTON AVENUE UC	8	RIV	91	17.82	Deck
56 0368	BUCHANAN STREET	8	RIV	91	10.29	Deck
56 0384	MADISON STREET UC	8	RIV	91	16.65	Deck
56 0385	BROCKTON AVENUE UC	8	RIV	91	17.43	Deck
56 0409	FAIRMOUNT BLVD UC	8	RIV	60	11.44	Deck
56 0416	MARKET STREET UC	8	RIV	60	11.07	Deck
56 0418	ORANGE STREET OC	8	RIV	60	11.82	Deck

56 0430	22ND STREET UC	8	RIV	10	11.96	Deck
56 0433	PENNSLVNA AVENUE UC	8	RIV	10	8.21	Deck
56 0434	CALIFORNIA AVENUE UC	8	RIV	10	7.32	Deck
56 0446	TEMESCAL WASH BOH	8	RIV	91	6.93	Deck
56 0451G	E60-E10 CONNECTOR	8	RIV	60	30.44	Deck
56 0452F	W10-W60 CONNECTOR	8	RIV	10	6.67	Deck
56 0484L	COUNTY LINE ROAD UC	8	RIV	10	0.02	Deck
56 0486	MORENO BEACH DR OC	8	RIV	60	19.12	Deck
56 0523	INDIAN STREET OC	8	RIV	60	15.85	Superstructure
56 0540R	BEDFORD WASH	8	RIV	15	36.58	Deck
56 0571	WHITEWATER OC	8	RIV	10	27.23	Deck
56 0586G	N15-W91 CONNECTOR OC	8	RIV	15	41.52	Deck
56 0617L	DILLON ROAD UC	8	RIV	10	58.89	Deck
56 0617R	DILLON ROAD UC	8	RIV	10	58.89	Deck
56 0687G	E60-N15 CONNECTOR	8	RIV	60	44	Deck
56 0739L	WASSON CANYON WASH	8	RIV	15	21.57	Deck
56 0739R	WASSON CANYON WASH	8	RIV	15	21.57	Deck

\* Structurally Deficient means the bridge needs repairs to prevent minor problems such as minor cracks, erosion, peeling paint, pot hole, etc. from becoming more serious.

#### LEGEND

**Caltrans Bridge Number** - The number assigned by Caltrans to identify each bridge on the State Highway System.

**Caltrans Bridge Name** - The name assigned to the bridge by Caltrans.

**Location** - The location of each bridge is identified by Caltrans District number, the abbreviation of the county in which it is located, the route on which it is located and the post mile at which it is located.

**Reason for Designation** - The reason for designating the bridge "Structurally Deficient." The term "Structurally Deficient" should not be misconstrued to mean a bridge is in danger of collapsing. Structurally Deficient means the bridge needs repairs to prevent minor problems such as minor cracks, erosion, peeling paint, pot hole, etc. from becoming serious.

**Deck** - The part of the bridge that is supported on the Superstructure and carries the traffic.

**Superstructure** - The part of the bridge that is above the Substructure and below the deck and consists of the main load carrying members of the bridge, such as the girders.

**Substructure** - The part a bridge consisting of piers or columns and abutments which carry the load of the Superstructure to the underlying soil or rock.

**Culvert** - In this context it is a large concrete pipe, usually for drainage with roadway above it.

**Superstructure** - The part of the bridge that is above the Substructure and below the deck and consists of the main load carrying members of the bridge, such as the girders.

**Substructure** - The part a bridge consisting of piers or columns and abutments which carry the load of the Superstructure to the underlying soil or rock.

**Culvert** - In this context it is a large concrete pipe, usually for drainage with roadway above it.

Provided below is a list of all fracture critical state highway system bridges. A fracture critical bridge is a steel structure that is designed with little or no load path redundancy. Load path redundancy is a characteristic of the design that allows the bridge to redistribute load to other structural members on the bridge if any one member loses capacity. This designation is a function of the design of the bridge and not the condition. In fact, a brand new bridge can be fracture critical. Caltrans has a fracture critical inspection unit that uses specialized access and non-destructive testing equipment to identify any potential concerns, even those that are not visible to the human eye.

**Fracture Critical State Highway Bridges**

<b>Bridge number</b>	<b>Caltrans Name Loc</b>	<b>Hwy</b>	<b>County</b>	<b>Mile</b>
54 0431	ROUTE 66/S215 SEP & OH	66	SBD	22.99
54 0684	ASH SIDEHILL VIADUCT CHAPARRAL SIDEHILL	18	SBD	17.54
54 0752	VIADUCT EVERGREEN SIDEHILL	18	SBD	12.49
54 0754	VIADUCT GRANITE SIDEHILL	18	SBD	11.9
54 0789	VIADUCT	18	SBD	11.45
54 0790	FIR SIDEHILL VIADUCT BOULDER SIDEHILL	18	SBD	11.54
54 0847	VIADUCT JUNIPER SIDEHILL	18	SBD	12.68
54 0875	VIADUCT	18	SBD	16.33
56 0066L	BEAUMONT OH	60	RIV	30.24
56 0314	UNIVERSITY AVENUE UC	91	RIV	20.45
56 0315	MISSION INN AVENUE UC	91	RIV	20.53

**Priority Structurally Deficient Bridge List and Sufficiency Rating 50 or Less**

<b>B. Number</b>	<b>Caltrans Name Loc</b>	<b>County</b>	<b>Hwy</b>	<b>Mile</b>	<b>Reason for Designation</b>	<b>Status</b>	<b>Code</b>	<b>Rating</b>
54 0345	EAST FORK CITY CREEK	SBD	33	33.0	None Rail	Programmed Repair	SD	49.1
54 0530	WASHINGTON AVENUE OC	SBD	21	2.6	Deck/Structure	Proposed Repair	SD	20.2
54 0886L SD	08-SBD-0-R MARBLE WASH	SBD	40	80.42	Super Superstructure	Completed	SD	38.1
54 0886R SD 39.1	08-SBD-040-R Super					Replacement		
Superstructure Replacement Completed	MARBLE WASH	SBD	40	80.44	Super Superstructure	Completed	SD	39.1
54 0887L	FORTRES S WASH	SBD	40	90.53	Super Superstructure	Completed	SD	39.1
54 0887R SD 39.1	08-SBD-040-R Super					Replacement		
Superstructure Replacement Completed	FORTRES S WASH	SBD	40	90.52	Super Superstructure	Completed	SD	39.1



Superstructure Replacement Completed					re	Completed		
54 0888L 08-SBD-040-R91.64 SD 39.1 Super	NEPRUD				91.	Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	64	Super	Completed	SD	39.1
54 0888R 08-SBD-040-R91.66 SD 39.1 Super	NEPRUD				91.	Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	66	Super	Completed	SD	39.1
54 0890L 08-SBD-040-R94.37 SD 39.1 Super	MACDON					Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	37	94.	Super	Completed	SD 39.1
54 0890R 08-SBD-040-R94.37 SD 39.1 Super	MACDON					Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	37	94.	Super	Completed	SD 39.1
54 0892L 08-SBD-040-R97.14 SD 39.1 Super	CHUCKW					Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	14	97.	Super	Completed	SD 39.1
54 0892R 08-SBD-040-R97.14 SD 39.1 Super	CHUCKW					Super	Replacement	
Superstructure Replacement Completed	WASH	SBD	40	14	97.	Super	Completed	SD 39.1
54 0893L 08-SBD-040-R97.62 SD 39.1 Super	MUSTAN					Super	Replacement	
Superstructure Replacement Completed	G WASH	SBD	40	62	97.	Super	Completed	SD 39.1
54 0893R 08-SBD-040-R97.62 SD 35.9 Deck	MUSTAN					Deck/Supers	Replacement	
Deck/Superstructure Replacement Completed	G WASH	SBD	40	62	97.	structure	Completed	SD 35.9
54 1000	DO				14	Sub	Programmed	
	RIVER	SBD	62	2.6	Sub	Structure	Repair	SD 6
	STRAWB						Proposed	
56 0180	CREEK	RIV	74	53.	None	Rail	Repair	SD 49.5
				45			Proposed	
54 0270L	OAT				13	Sub		
	DITCH	SBD	15	0.6	Sub	Structure	Project	SD 67.6
	WARM						Project	
56 0272R 08-RIV-015-7.78-TMCA SD 65.7	SPRINGS				7.7	Sub	Underway	
	CREEK	RIV	15	8	Sub	Structure		SD 67.5

## **BIBLIOGRAPHY: Additional Regional Material**

### **The Kiplinger California Letter**

April 3, 2002

Inland Empire road and condominium projects

SECTION: Vol. 38, No. 7

LENGTH: 96 words

Big Inland Empire road plans. Caltrans will spend \$184 million to add one lane on each side of I-15 between Victorville and Barstow. Reconfiguring the Riverside interchange of highways 91, 60 and I-215 will cost \$290 million. Includes longer carpool lanes and fewer ramps. Work ends this year on 210 freeway from Rancho Cucamonga to L.A. County. And it starts in fall or winter on stretch from Rialto to San Bernardino.

174-condo National City subdivision has been OK'd by city council east of Plaza Bonita Shopping Center...gated community with parks, pool.

COMPANY: INLAND EMPIRE NATIONAL BANK (RIVERSIDE CALIFORNIA) (91%);

INDUSTRY: SIC6021 NATIONAL COMMERCIAL BANKS (91%);

CITY: RIVERSIDE, CA, USA (91%);

STATE: CALIFORNIA, USA (92%);

COUNTRY: UNITED STATES (92%);

LOAD-DATE: September 30, 2002

LANGUAGE: ENGLISH

### **USA TODAY**

December 17, 2007 Monday

FINAL EDITION

Shipping hubs spring up inland;  
Landlocked ports move goods, take weight off coasts

BYLINE: Jordan Schrader

SECTION: NEWS; Pg. 2A

LENGTH: 672 words

### **The Associated Press**

January 8, 2007 Monday 7:24 PM GMT

150th anniversary of big California earthquake is marked with little fanfare

BYLINE: By ALICIA CHANG, AP Science Writer

SECTION: DOMESTIC NEWS

LENGTH: 592 words

DATELINE: LOS ANGELES

### **Tomographic investigation of the wear along the San Jacinto fault, southern California**

Tae-Kyung Hong, and William Menke

Lamont-Doherty Earth Observatory of Columbia University, 61 Route 9W, Palisades, NY 10964, USA

Received 25 October 2005; revised 14 December 2005; accepted 19 December 2005. Available online 23 March 2006.

### **Local earthquake reflection tomography of the Landers aftershock area**

Dapeng Zhao, , Sachiko Todo and Jianshe Lei

Geodynamics Research Center, Ehime University, Matsuyama 790-8577, Japan

Received 30 July 2004; revised 21 March 2005; accepted 8 April 2005. Editor: Scott King. Available online 16 June 2005.

### **Phenomenon of local 'seismic reversal' before strong earthquakes**

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International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy of Sciences, Warshavskoye sh. 79, kor. 2, Moscow 113556, Russian Federation

Available online 24 February 1999.

### **Institutions, routines, and crises Post-earthquake housing recovery in Mexico City and Los Angeles**

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College of Architecture and Urban Planning, The University of Michigan, Ann Arbor, MI 48109-2069 USA

Available online 11 January 2000.

#### **Abstract**

This is a study of how planning institutions deal with crisis recovery; that is, recovery from situations marked by complexity, uncertainty, and sudden change that increasingly characterize

contemporary cities. Based on an analytical framework derived from institutional literature and planning theory, the study examines two successful housing recovery programs during crisis situations: the Renovación Habitacional Popular program in Mexico City following the 1985 earthquake, and the Ghost Town program in Los Angeles following the 1994 earthquake. The study addresses the following research questions: In what manner were the planning institutions successful, if at all? Which familiar and established institutional arrangements, policies, programs, and practices (ie routines) did they adopt when faced with large, unexpected shocks (ie crises)? How do institutional actors in different political-economic contexts respond to similar crisis situations? What are the lessons of these institutional actions for future crises, and for normal operations in planning? The study argues that planning institutions perform successfully during crises due primarily to routines, which are usually overlooked or decried as being bureaucratic. Planning institutions responded effectively to the crises by adapting institutional routines quickly and efficiently to new circumstances. While these routines can be constraints under normal conditions, they also act as powerful tools during exceptional times, serving as catalysts to release the disciplined energy of institutions to perform effectively, resolve problems, and re-establish order.

Author Keywords: bureaucracies; crises; earthquakes; Mexico; Los Angeles

### **Blueprints / Inland Empire, Calif.**

Maura Webber Sadovi. Wall Street Journal. (Eastern edition). New York, N.Y.: Jan 2, 2008. pg. B.4

#### Abstract (Summary)

Tim Feemster, senior director of global logistics for Grubb & Ellis in Dallas, also says that warehouse markets typically hold up longer than other commercial real-estate sectors in a slowing economy partly because manufacturers often need space to store inventories that swell before production can be ratcheted down to match lower demand.

### **Inland transport key to S. Calif. warehouse boom; [The Journal Of Commerce Online Edition]**

bill Mongelluzzo / The JOURNAL of COMMERCE ONLINE. Journal of Commerce. New York: May 17, 2007. pg. 1

#### Abstract (Summary)

As a result, logistics centers are beginning to emerge 75 miles or more from the ports in the eastern Inland Empire and near Victorville in the high desert. The planning group is considering several possible infrastructure developments to serve these emerging regions. One proposal calls for truck lanes, with tolls, on an 18- mile corridor along the I-710 freeway that serves the ports; a 38- mile east-west corridor that would connect with the I-710, and an 86- mile corridor along I-15.

## **EXECUTIVE SUMMARY // Who cares about logistics?**

BOB DIXON. The Business Press. Ontario, Calif.: Jan 30, 2006. pg. 2

### **Abstract (Summary)**

Slate, perhaps the best-known of online magazines, recently suggested that if "The Graduate" were to be updated today, that one word whispered by Mr. McGuire to newly minted grad Benjamin Braddock would be "logistics."

Southern California is one of the nation's major trade, transportation and logistics hubs, and the industry is a major factor driving growth throughout the Inland Empire. Here, perhaps more than anywhere else in the nation, logistics is, as [Daniel Gross] puts it, "smokin' hot."

## **Shaking hazard compatible methodology for probabilistic assessment of permanent ground displacement across earthquake faults**

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aDepartment of Civil and Environmental Engineering, University of Southern California, Los Angeles, CA 90089-2531, USA

Received 9 February 2005; accepted 13 April 2006. Available online 20 December 2006.

### **Abstract**

A methodology for probabilistic hazard assessment of permanent displacement across faults caused by earthquake rupture is presented, compatible with region specific models for ground shaking hazard in California, developed earlier by the authors and coworkers. Assessment of permanent dislocations across faults is important for the design and retrofit of highway bridges and tunnels crossing faults, as well as for other lifelines crossing faults, such as aqueducts, water and gas lines, etc. The methodology is illustrated for two strike-slip faults (prototypes of Class A and Class B faults in California), for 50 years exposure. The illustrations show that, for given seismic moment rate, the hazard estimates are quite sensitive to how the seismic moment is distributed over earthquake magnitudes. They also show that the hazard is small even for very small levels of displacement, in contrast to ground shaking hazard, which is due to the fact that only one fault contributes to the hazard and not every event on that fault necessarily affects the site.

## **Assessment of seismic vulnerability of structures**

Amr S. Elnashai, a,

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Available online 21 August 2006.

## Abstract

The paper addresses the application of effective tools for investigating structural integrity under earthquake loading, namely experimental testing, computer analysis and field data collection, and their combination. In particular, the application of hybrid (experimental-analytical) distributed (using several sites) simulation, hereafter referred to as HDS, to investigate seismic response of complex systems is presented. After briefly reviewing and comparing approaches of field surveys, testing, analysis and hybrid simulation, the paper deals with five applications where at least two of the three tools have been successfully applied. The collapse of the I-880 (Cypress Viaduct) during the Loma Prieta (California) earthquake of 1989 was investigated analytically following field observation of the failure modes. A plausible mechanism was postulated based on advanced analysis and supported by field data. Analytical studies aimed at quantifying the demand imposed on steel moment frames in the Northridge (California) earthquake of 1994 pointed towards a possible contribution of vertical beam modes to the increased rotational demand imposed on connections, leading to their failure. Next, issues of irregularity and lack of seismic detailing in RC buildings, repeatedly observed to be a major contributor to damage, are studied at full scale using laboratory testing, supported by advanced analysis to steer the model design and tune the level of input motion. Reinforced concrete bridges are also studied, using advanced analysis and field observations to investigate the partial collapse of a ramp structure part of the Santa Monica Freeway (I-10). Finally, two examples of applications of hybrid distributed simulation (HDS) are presented, one of which is a continuation of the steel moment frames analytical investigation. It is emphasized that it is only through integrating the available investigation tools that the response of complex systems may be understood, leading to more economical and safer built environments in regions subjected to earthquakes.

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