

FEMA's Essential Facilities Risk Assessment Pilot Projects - Orange, Riverside and San Bernardino Counties

Southern California HAZUS User's Group Meeting

January 15, 2008



FEMA MAP IX-Mainland



OCEFRA, RCEFRA & SBEFRA Project Goal

- The on-going DFIRM updates provide us with an excellent opportunity to demonstrate the synergies between FEMA's Map Modernization (Map Mod) Project and FEMA's HAZUS® natural hazard loss estimation software, with products useful to emergency preparedness and hazard mitigation planning.
- Three Southern California Counties – Orange, Riverside & San Bernardino – have been selected for comprehensive multi-hazard HAZUS-Map Mod Risk Assessment projects.



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Project Overview

- Each effort is being guided by a Community Executive Committee (CEC).
- Essential Facilities Data Collection and HAZUS Incorporation
- Earthquake Hazard Scenario Selection (2) and Risk Assessment
- Incorporation of DFIRM data into HAZUS
- Flood Risk Assessment (Two 100 yr events, w/ & w/out levees & one 500 yr event, and possibly local tsunami for OC)
- Risk Assessment Report
- Guidelines Document (part of OC scope)
- One year schedule
- *Additional task relates to incorporation of County Assessor's data, if available in OC. Similar tasks may also be funded in Riverside & SB.*



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What Value Are the Results?

- Risk Assessment results feed directly into Hazard Mitigation Planning
- Establishes a **Community Executive Committee** knowledgeable about the process, results, and future directions.
- Centralized GIS Data to be shared with community partners:
 - Essential Facilities
 - Enhanced Regional Building Inventory, if developed
 - Risk Assessment Report for Flood & Earthquake
 - DFIRM data layers
- Guideline documents for other jurisdictions



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Risk Assessment Results

- County-Specific Impact Estimates:
 - Economic losses, Building damage
 - Population Impacts (casualties – EQ only, shelter needs – EQ & flood)
- Essential facilities Damage:
 - Damage Assessment
 - Facility Functionality



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Vision for the Executive Committee

- Establish representation from local communities and agencies to work with FEMA for enhancement of the County's capabilities for natural hazard risk assessment.
- The working group will meet 2 or 3 times over the one year project to guide development, ensure usability of products, and result in the best possible risk information for each County.



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OCEFRA CEC Members

- OC Sheriff's Department - Emergency Management
- OC Fire Authority
- OC Department of Education
- County of Orange, Resources & Development Management Dept.
- OC Health Care Agency
- Hospital Association of Southern California
- California Office of Emergency Services
- City of Newport Beach
- City of San Clemente
- Santa Ana Unified School Dist
- University of California, Irvine
- U.S. Congressman Dana Rohrabacher's Staff



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RCEFRA CEC Members

- Riverside Co. Fire OES
- Riverside Co. Sheriff's Department
- City of Corona
- City of Riverside
- City of Moreno Valley
- City of Indio
- City of Palm Springs
- Morongo Band of Mission Indians
- Hospital Assoc. of Southern California



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SBEFRA CEC Members (Invited, but not confirmed)

- City of Colton
- County Administrative Office/EMS
- County Administrative Office
- County Assessor's Office
- County Board of Supervisors
- County Fire Department
- County Information Services Department
- County Land Use Services Department
- County Land Use Services Department/B&S
- County Public Health Department
- County Public Works Department
- County Sheriff's Department
- County Special Districts
- ESRI
- School Districts
- State OES
- Tribes (San Manuel Band of Mission Indians)



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Project Phases

- 4 Phases:
 - 1 – Initial Coordination, Establishment of Community Exec. Committee, Identify points of contact
 - 2 - Data Collection & Review
 - 3 - HAZUS Analyses - EQ & Flood
 - 4 - Risk Assessment Report (+ Guidelines Document in OC)
- **STATUS:**
 - Orange County – Phase 2 nearing completion
 - Riverside & San Bernardino – end of Phase 1, beginning of Phase 2



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Digital FIRM

DFIRM
DEVELOPMENT
SCHEDULE:

Orange Co. – Data
available end of Feb
2008, Map final end of
March, 2008

Riverside Co. - map &
data final end of
January, 2008

San Bernardino Co. –
map & data final end
of January, 2008



Base Map



Flood Data



Digital
FIRM



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Orange Co FIRM

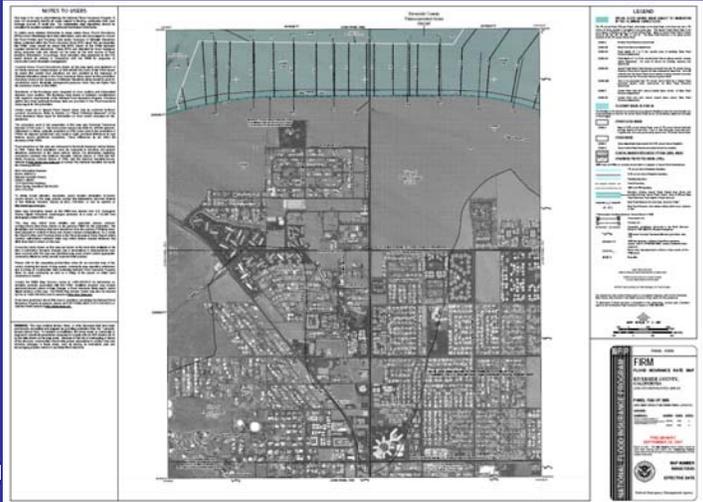
- Levee failure scenarios in process
- Working with community to identify structures correctly



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Riverside County FIRM

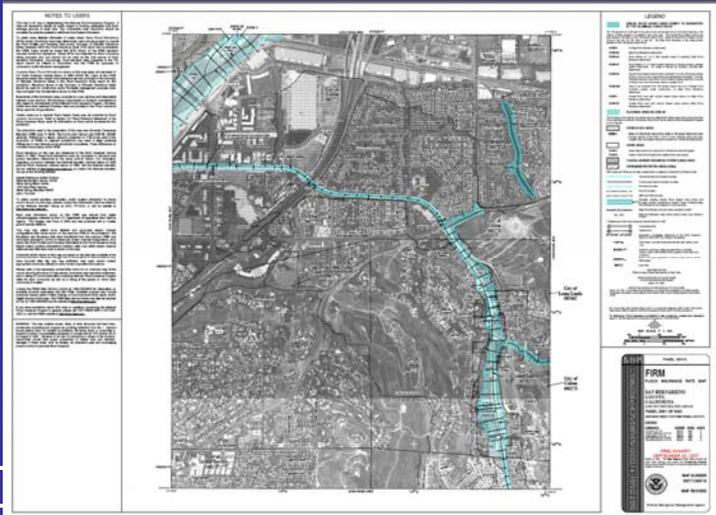
(as of Sept 28, 2007)



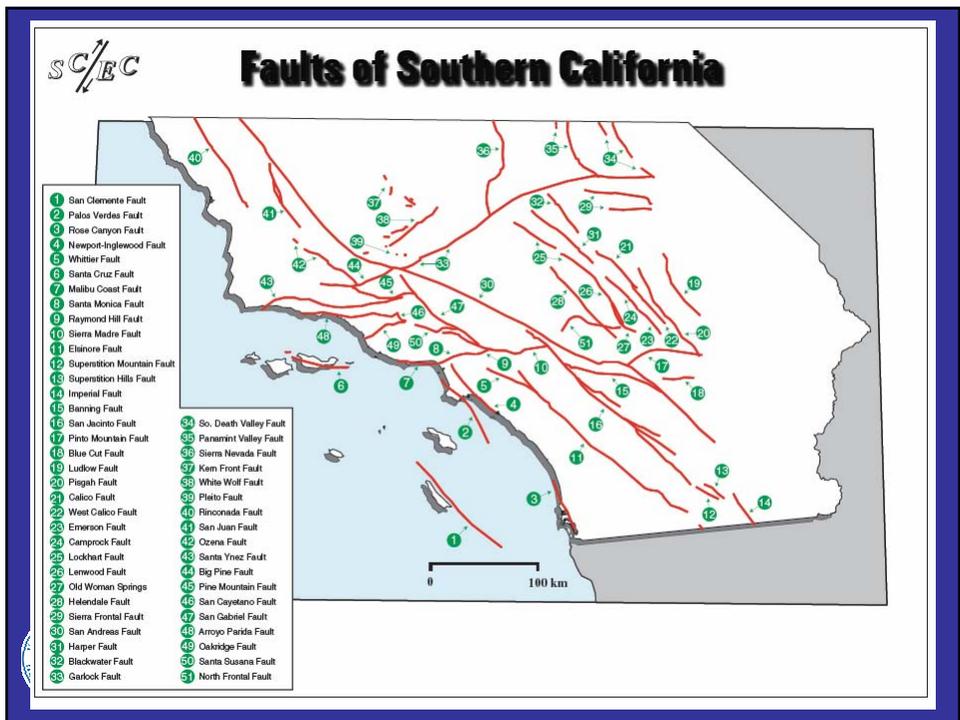
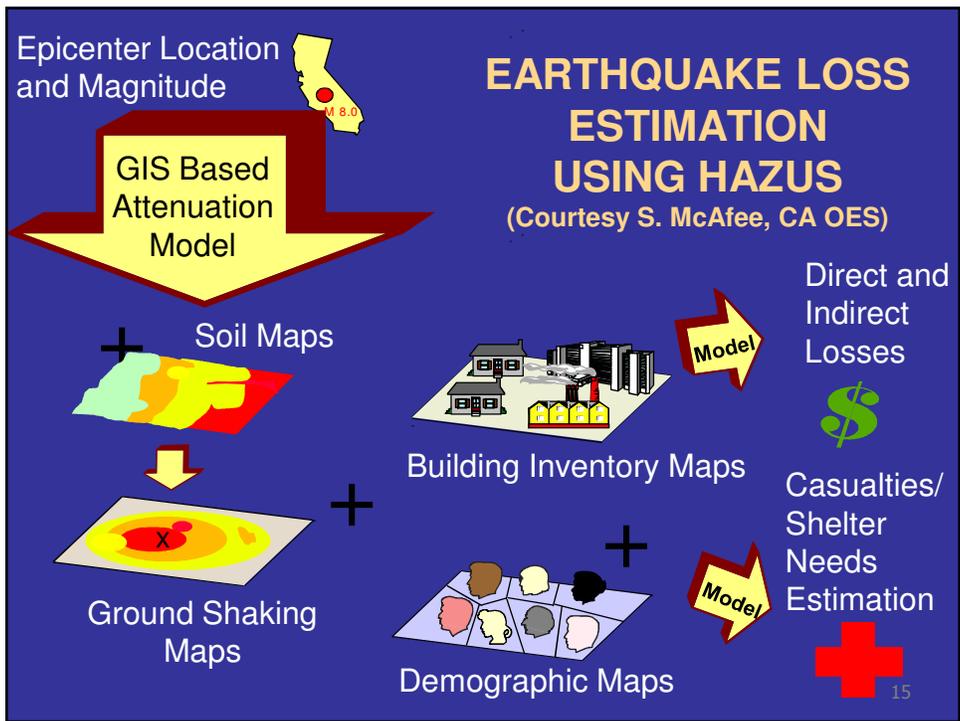
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San Bernardino Co. FIRM

(September 28, 2007)



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GROUND SHAKING MAPS & DATA

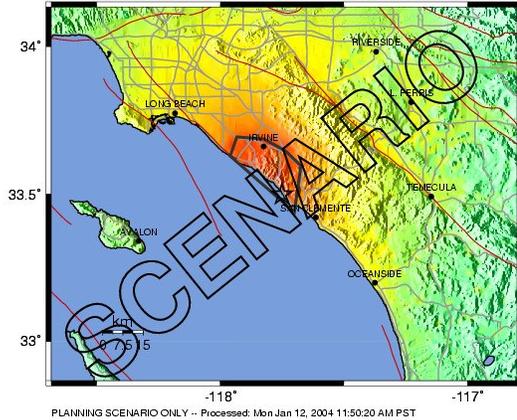
Scenario Earthquake ShakeMaps available for So. Cal. From the USGS.

15 available Scenario ShakeMaps reviewed by OCEFRA CEC to select 2 for risk assessment.



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-- Earthquake Planning Scenario --
 Rapid Instrumental Intensity Map for San Joaquin Hills Scenario
 Scenario Date: Sat Jan 11, 2003 04:00:00 AM PST M 6.6 N33.50 W117.75 Depth: 7.5km

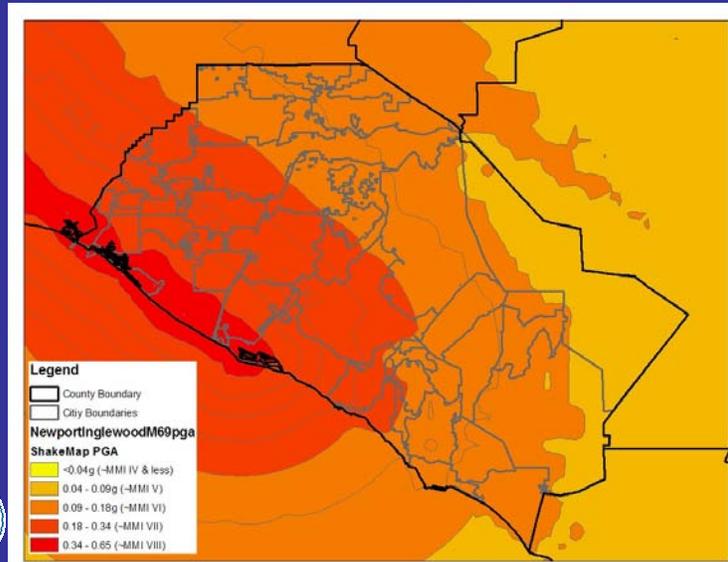


PLANNING SCENARIO ONLY -- Processed: Mon Jan 12, 2004 11:50:20 AM PST

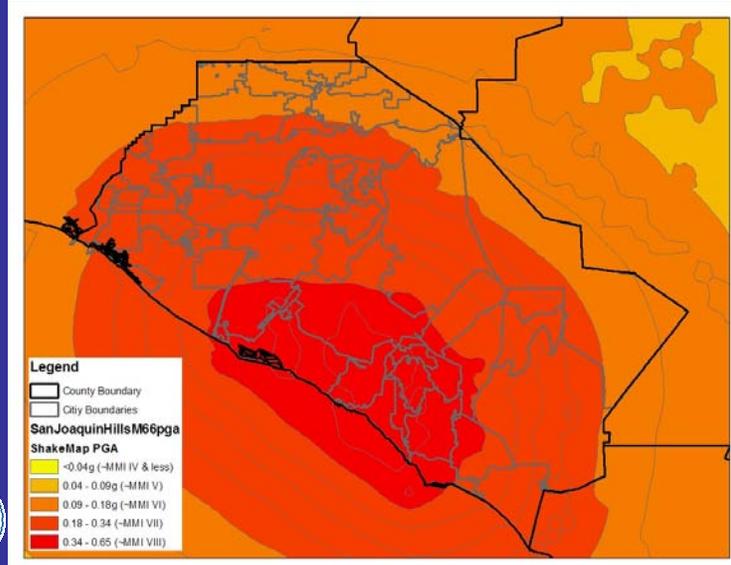
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Vary strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC (%)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

<http://www.cisn.org/shakemap/sc/shake/>

Scenario 1 Selected by OCEFRA CEC: M6.9 Newport Inglewood Fault



Scenario 2 Selected by OCEFRA CEC: M7.1 San Joaquin Hills Fault



Shaking & Potential Damage

<i>Intensity</i>	<i>Acceleration (%g)</i>	<i>Perceived Shaking</i>	<i>Potential Damage</i>
I	< 0.2	Not Felt	None
II-III	0.2 - 1.5	Weak	None
IV	1.5 - 4	Light	None
V	4 - 9	Moderate	Very Light
VI	9 - 18	Strong	Light
VII	18 - 34	Very Strong	Moderate
VIII	34 - 65	Severe	Mod. to Heavy
IX	65 - 124	Violent	Heavy
X+	> 124	Extreme	Very Heavy



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Adapted from <http://pasadena.wr.usgs.gov/shake/pubs/shake/shake.html>

HAZUS-MH Default Inventory Data

Default inventory data includes:

- “General building stock” - proxy representation of all buildings in the U.S.
- Essential facilities* – hospitals, schools, etc.
- Transportation lifelines* – highway, railway, etc.
- Utility Lifelines* – water, power, gas, etc.
- Demographics
- Economic values

* In some cases, default data may be limited or unavailable



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Inventory Data

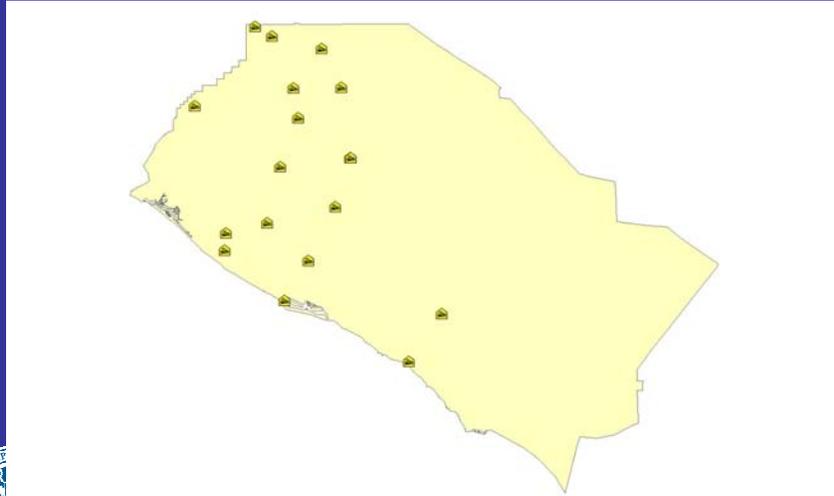
- Essential Facilities inventory data is stored two ways:
 - Data common to all hazards
 - Address
 - Geographic Location
 - Contact Info, etc.
 - Hazard-specific data
 - EQ – model building type, quality, design level, site-specific EQ hazard data
 - Flood – Pre-FIRM/Post-FIRM, foundation type, first floor elevation, flood protection



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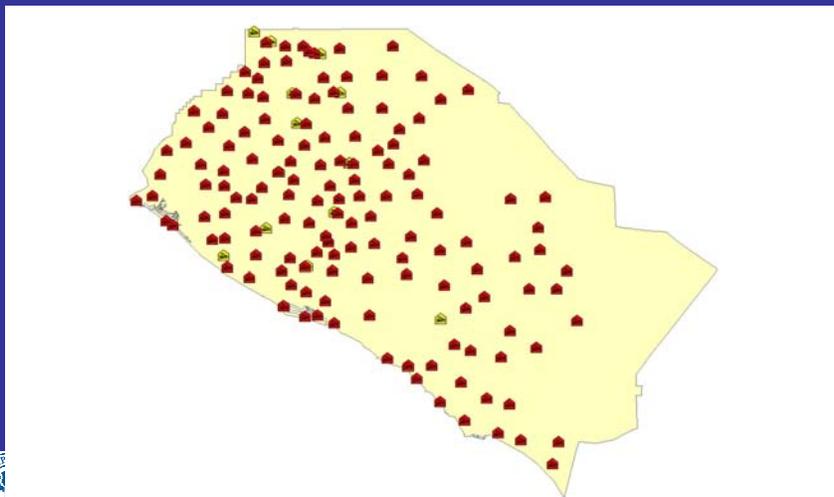
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HAZUS Default data for Fire Stations in Orange County (18 facilities)



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OCEFRA Fire Station Data (139 Stations, GIS data rec'd from OCFA)



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FINAL OCEFRA Fire Station Data

- Location
- Apparatus data
- Building Data:
 - \$ Value
 - Bldg sq ft
 - Str. type
 - # Stories
 - Year Built
 - Foundation
 - 1st floor hgt
 - BU power

Department	# Stations
OCFA	61
Anaheim FD	11
Brea FD	4
Costa Mesa FD	6
Fountain Valley FD	2
Fullerton FD	6
Garden Grove	7
Huntington Beach FD	8
La Habra (LA Co.)	4
Laguna Beach	4
Newport Beach FD	8
Orange FD	8
Santa Ana FD	10
Total	139



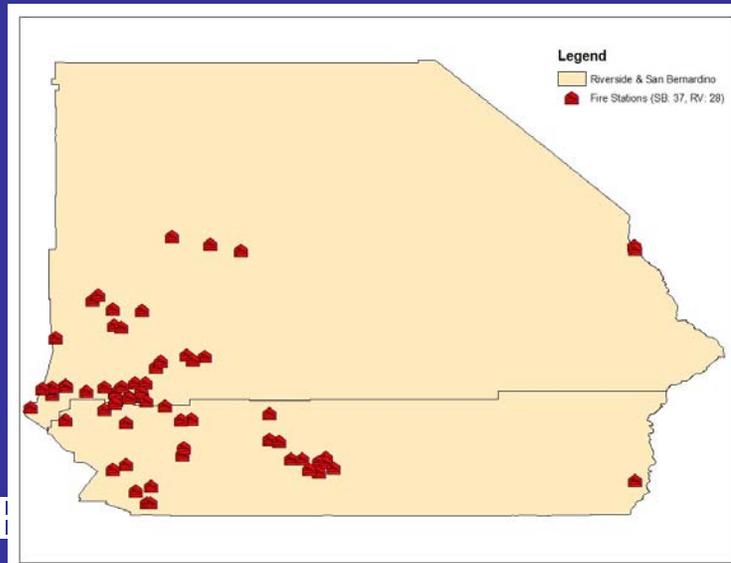
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HAZUS Default Fire Station data: Riverside & San Bernardino Co.

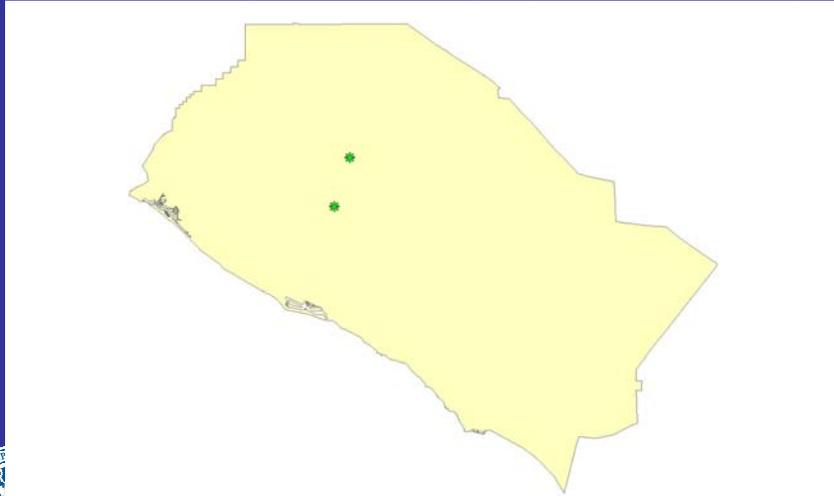
HAZUS default data often identifies Main Fire Dept. facility only...

Riverside County FD/CDF has 95 stations, plus City FDs...



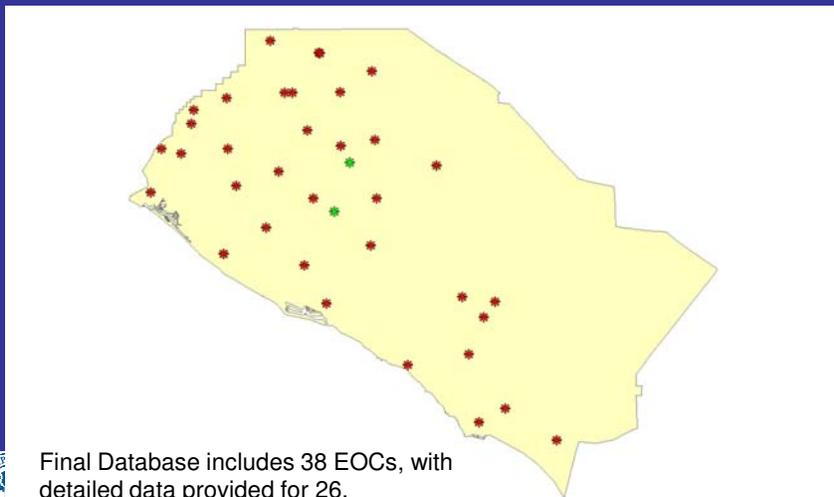
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HAZUS Default data for EOCs in Orange County (2 facilities)



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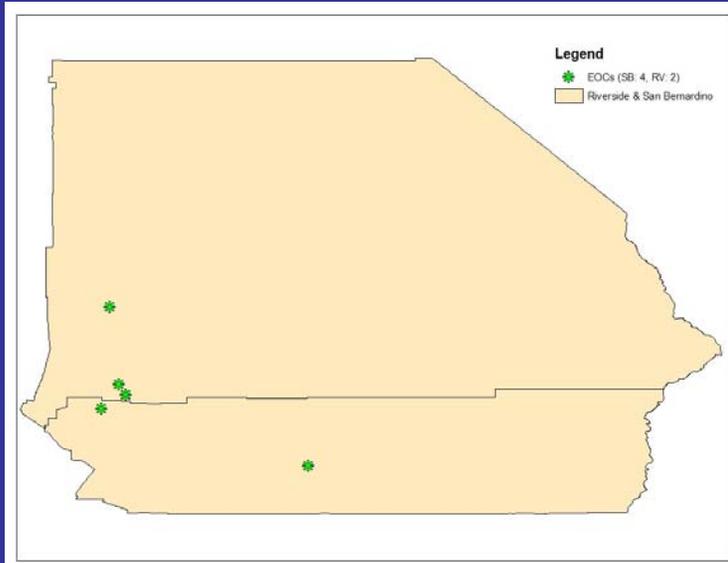
OCEFRA EOC Data (38 facilities, GIS data rec'd from CA OES)



Final Database includes 38 EOCs, with
detailed data provided for 26.

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HAZUS Default EOC data: Riverside & San Bernardino Co.



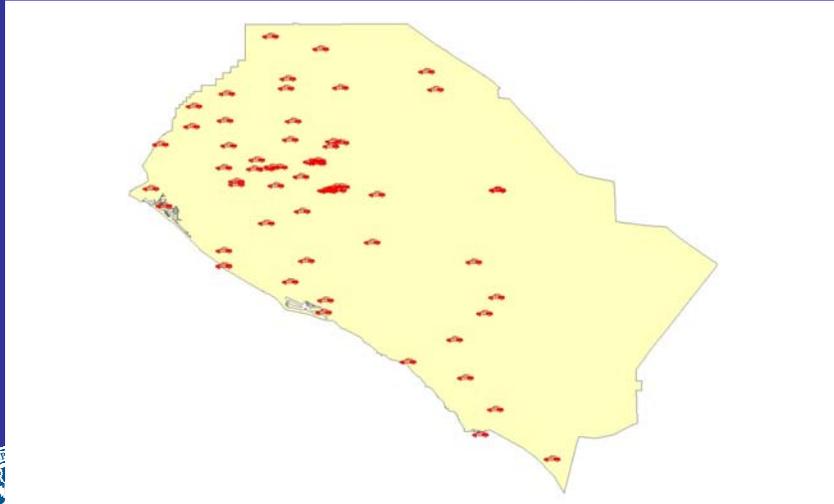
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HAZUS Default data for Police Stations in Orange County (33 facilities)



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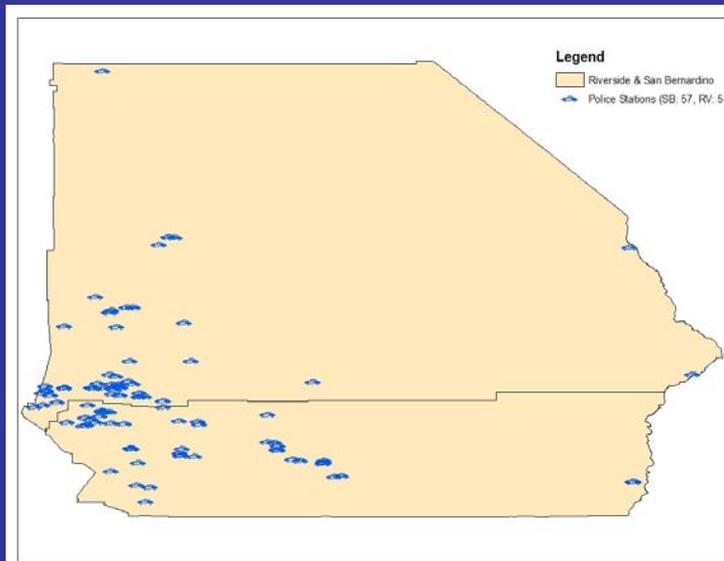
OCEFRA Police Station Data (62 Stations)



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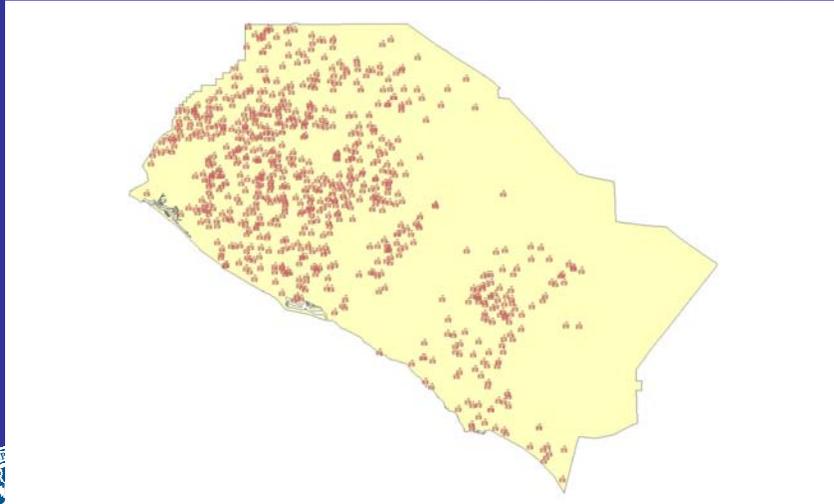
HAZUS Default Police Station data: Riverside & San Bernardino Co.

Note:
HAZUS
default
data
often
identifies
Main
Police
Dept.
facility
only...



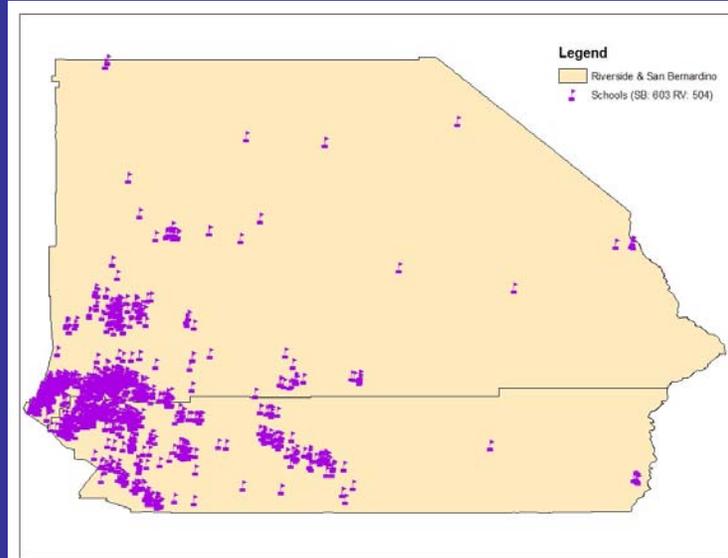
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HAZUS Default data for Schools in Orange County (809 Sites)



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HAZUS Default School data: Riverside & San Bernardino Co.



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School Data Collection

- Sample detailed insurance appraisal data rec'd from Santa Ana Unified School District (~10% of school buildings/enrollment in OC).
- Report included a significant amount of data needed for HAZUS, including:
 - Location
 - Building Value
 - Construction/Structural Info
 - # Stories
 - Area/SQFT
 - Year Built
 - Kitchens
- Other data available from OCDE: enrollment, phone #



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SAUSD Detailed Data Compared to HAZUS Default

	SAUSD Data	HAZUS Default
# School Sites	57	50
# Buildings	1109	Individual building data not included (<i>Each school campus treated as a single "building"</i>)
Building Area (sq ft)	4.45 Million	No Data
Building Value	\$626.9 Million	\$29.5 Million
Contents Value	\$83.6 Million	Not included
Enrollment	57,346 (OCDE)	57,994
Year Built	1932 – 2006 Median = 1991	No Data
# Portable Buildings	706 (64%) Typ. 960 SF, \$72,000 bldg	No Data



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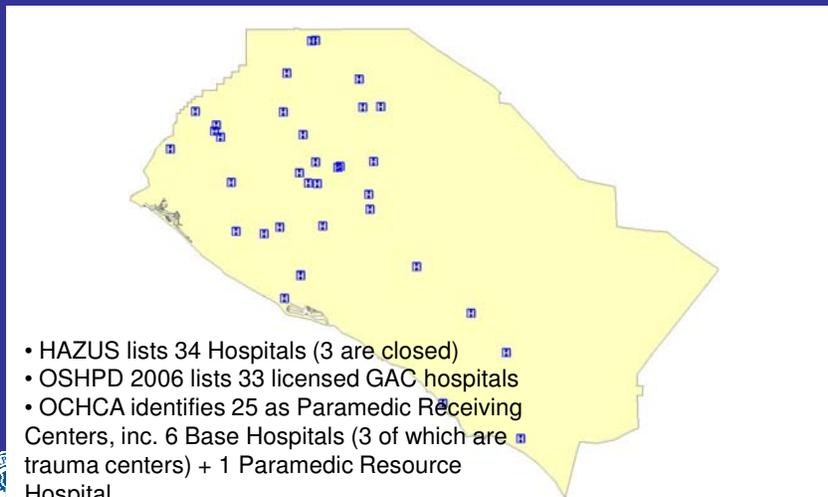
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OC Schools Data Provided by ASCIP

Member District Name	# Bldgs	Total Bldg Area (SqFt)	Bldg Replacement Value	Content Replacement Value
BREA OLINDA UNIFIED SCHOOL DISTRICT	130	567,211	\$85,438,000	\$17,366,000
CAPISTRANO UNIFIED SCHOOL DISTRICT	1,039	3,629,549	\$388,307,000	\$111,348,000
FULLERTON JOINT UHSD	177	1,316,182	\$227,711,000	\$36,816,000
FULLERTON SCHOOL DISTRICT	268	968,301	\$121,738,000	\$34,848,000
HUNTINGTON BEACH CITY SD	183	726,843	\$116,665,000	\$16,245,000
HUNTINGTON BEACH UNION HS DISTRICT	183	1,482,299	\$241,977,000	\$54,624,000
LAGUNA BEACH UNIFIED SCHOOL DISTRICT	59	325,824	\$61,548,000	\$7,710,000
NEWPORT-MESA UNIFIED SCHOOL DISTRICT	549	2,654,695	\$407,822,000	\$88,550,000
NORTH ORANGE COUNTY COMM COLLEGE DISTRICT	90	1,808,734	\$304,134,000	\$84,352,000
OCEAN VIEW SCHOOL DISTRICT	254	1,047,318	\$149,962,000	\$30,439,000
ORANGE COUNTY DEPT. OF EDUCATION	189	341,149	\$54,310,000	\$10,367,000
PLACENTIA-YORBA LINDA USD	668	1,952,228	\$297,886,000	\$67,926,000
RANCHO SANTIAGO COMM. COLLEGE DISTRICT	127	979,593	\$158,306,000	\$57,043,000
SANTA ANA UNIFIED SCHOOL DISTRICT	1,109	4,446,605	\$626,855,000	\$83,615,000
TUSTIN UNIFIED SCHOOL DISTRICT	387	1,610,335	\$239,043,000	\$49,472,000
	5,412	23,856,866	\$3,481,702,000	\$750,721,000



HAZUS Default data for Hospitals in Orange County (34 Facilities)

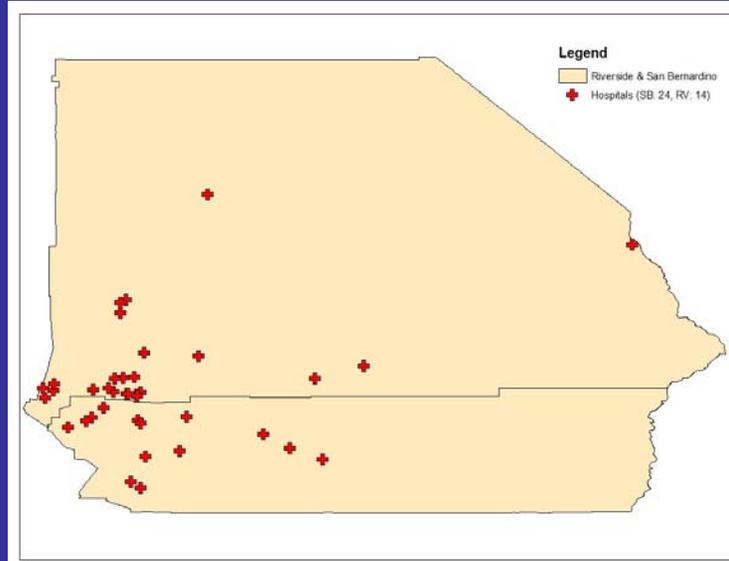


- HAZUS lists 34 Hospitals (3 are closed)
- OSHPD 2006 lists 33 licensed GAC hospitals
- OCHCA identifies 25 as Paramedic Receiving Centers, inc. 6 Base Hospitals (3 of which are trauma centers) + 1 Paramedic Resource Hospital.



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HAZUS Default Hospital data: Riverside & San Bernardino Co.



Next Steps

Orange County:

- Hospital data review
- Final data processing
- Earthquake risk assessments
- DFIRM completion & Flood hazard data processing
- Flood risk assessment

Riverside County:

- 1st CEC meeting held September 25, 2007
- Beginning data collection

San Bernardino County

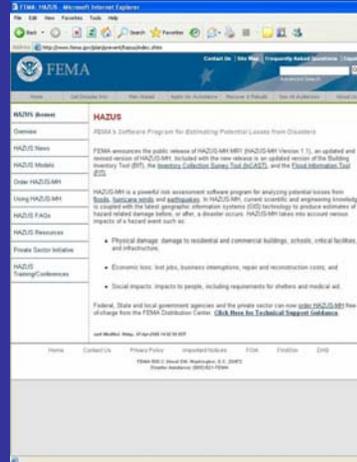
- 1st CEC meeting scheduled for February 13, 2008



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FEMA Resources

- HAZUS-MH Overview
- Resources
- Conference Information
- FAQs



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<http://www.fema.gov/plan/prevent/hazus/index.shtml>

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Contact Information

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See: www.map9-m.com for project documents, etc.

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