



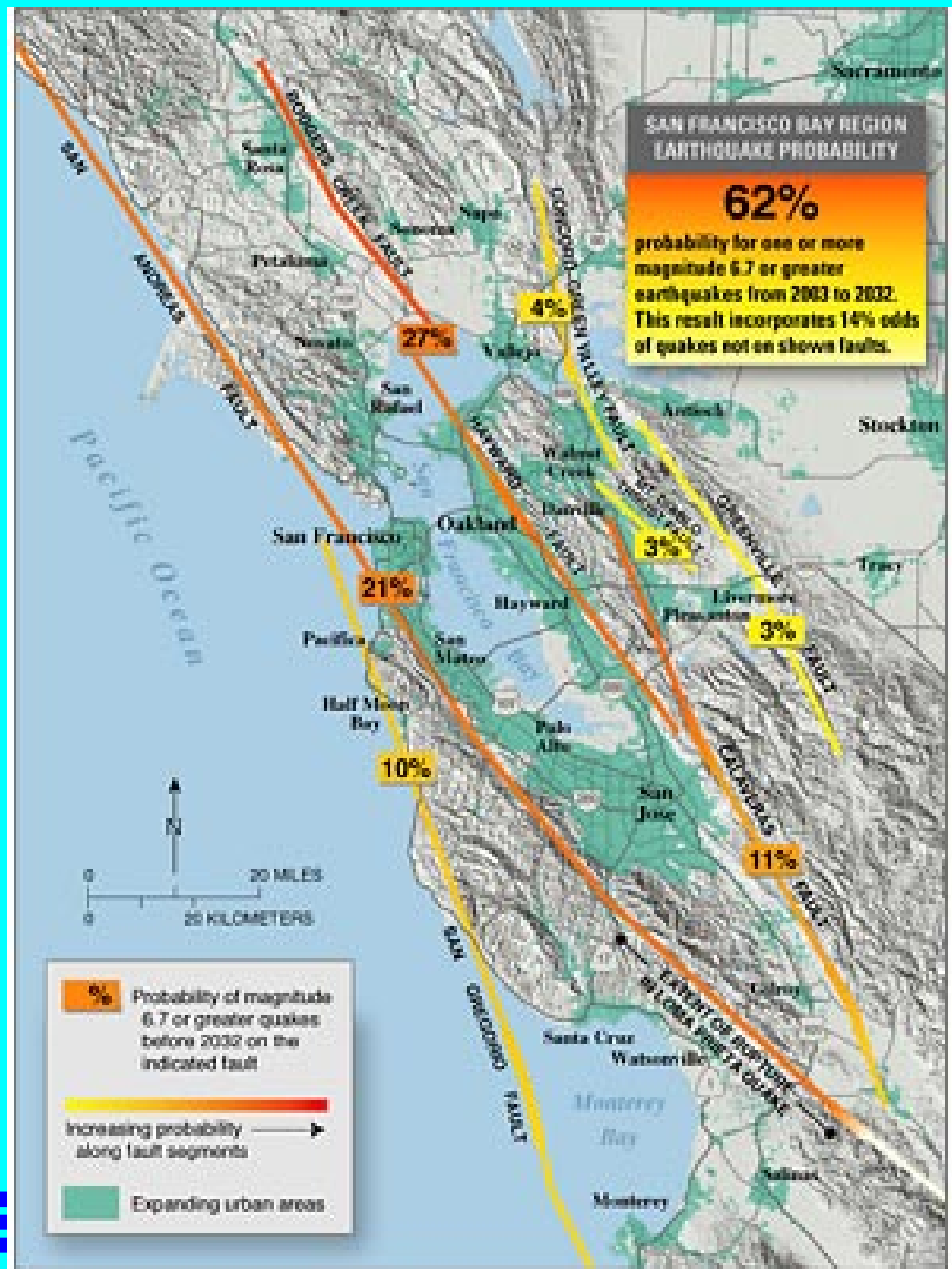
***BERKELEY and
the Bay Area
Earthquake
Nightmare***

JEANNE PERKINS

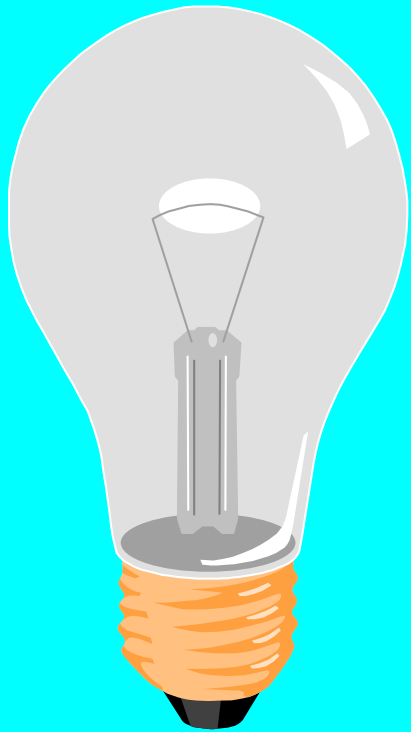
ABAG Earthquake Program Manager

*The NEXT
30 Years
for the
Bay Area*

= 62%



Magnitude Versus Intensity



MAGNITUDE IS A
MEASURE OF
EARTHQUAKE **SIZE**.

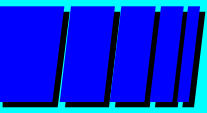
INTENSITY IS A
MEASURE OF
SHAKING **SEVERITY**,
OR **STRENGTH**.

How We Map Intensity

1 - **SIZE** or **MAGNITUDE** of the earthquake (based on the length of the fault source).

2 - **DISTANCE** and **DIRECTION** to the faults source.

3 - Type of **GEOLOGIC MATERIALS** at the site.



What Intensity Means

BUILDING DAMAGE

- The higher the intensity, the more likely buildings are damaged.
- BUT all buildings are not created equal.




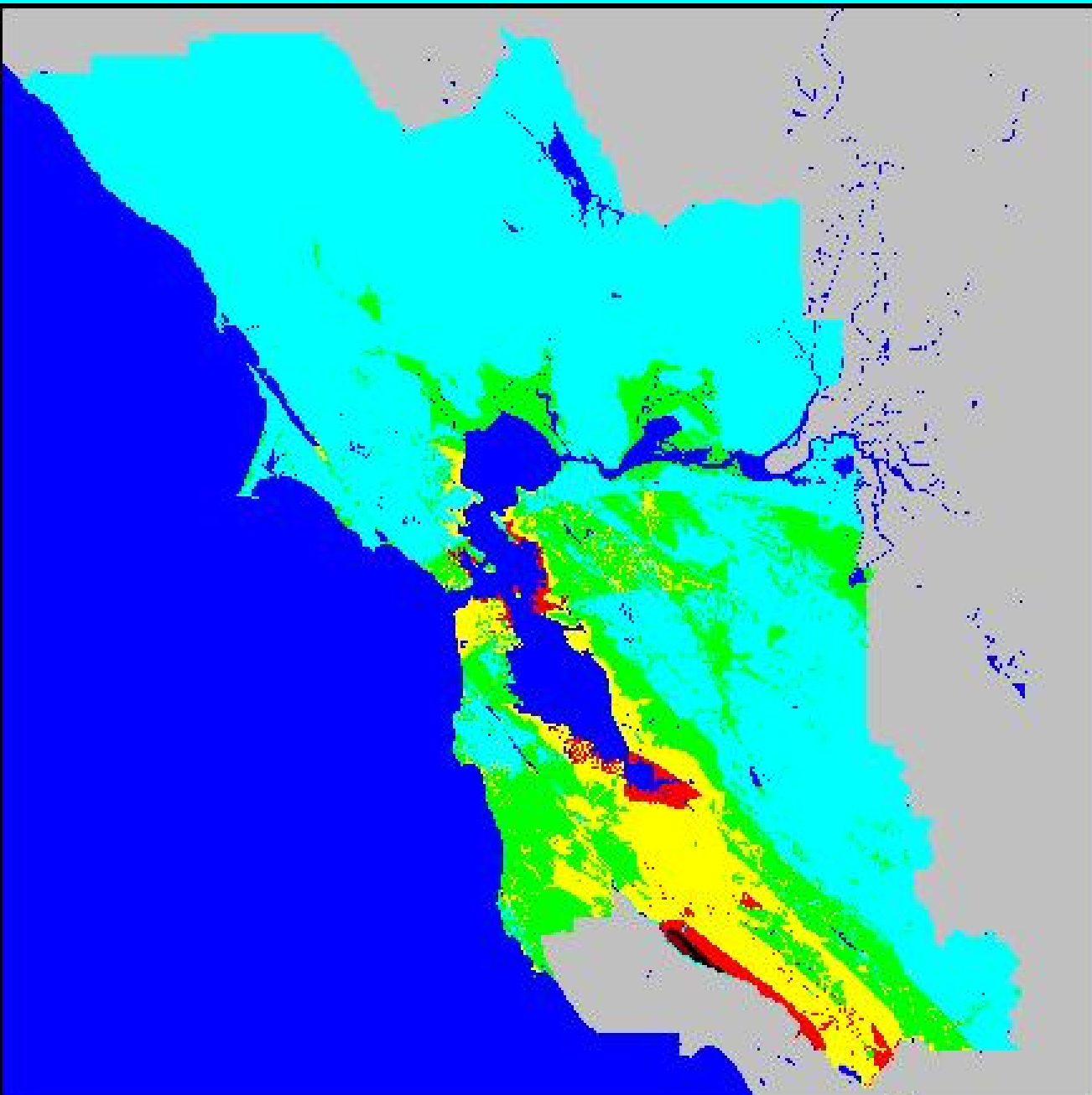


2 PAST EARTHQUAKES

- **16,000** Uninhabitable Housing Units
Due to the Loma Prieta Earthquake
- **48,000** Uninhabitable Housing Units
Due to the Northridge Earthquake

18 FUTURE EARTHQUAKES

- **13** Bigger than Loma Prieta
 - **8** Bigger than Northridge
- 



SHAKING INTENSITY

Model of the 1989
Loma Prieta Earthquake
Magnitude 6.9

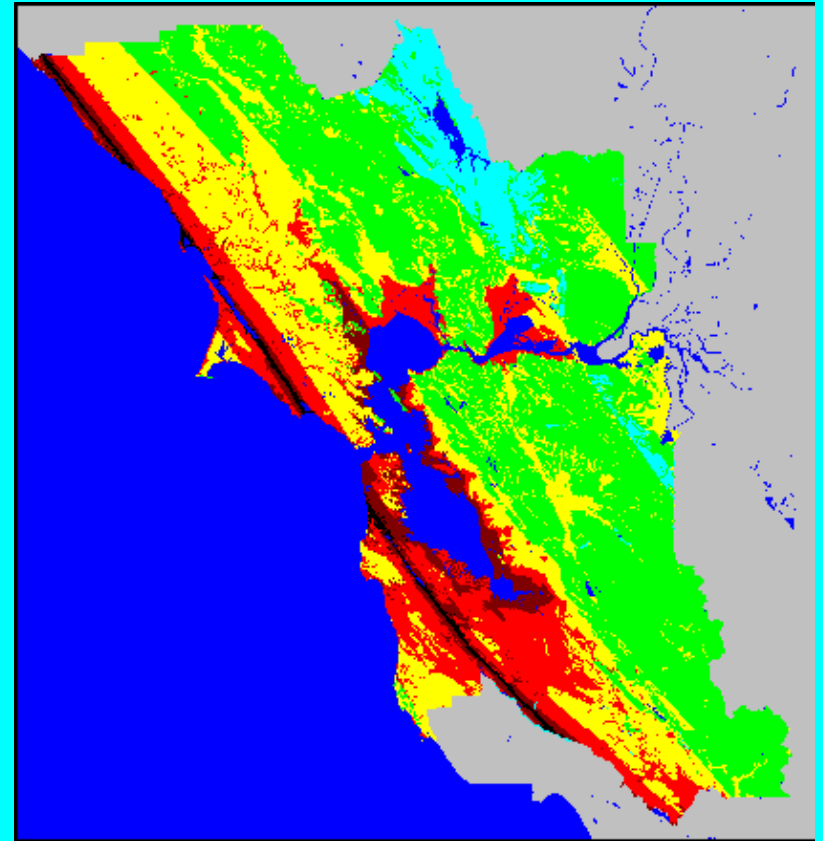
Modified Mercalli Intensity Shaking Severity Level

- X-Very Violent
- IX-Violent
- VIII-Very Strong
- VII-Strong
- VI-Moderate
- V-Light
- Highways
- Streets

Source: ABAG, 1999
The map is intended
for planning only.
Intensities may be
incorrect by one unit
higher or lower. Current
version of map
available on Internet at
<http://quake.abag.ca.gov>

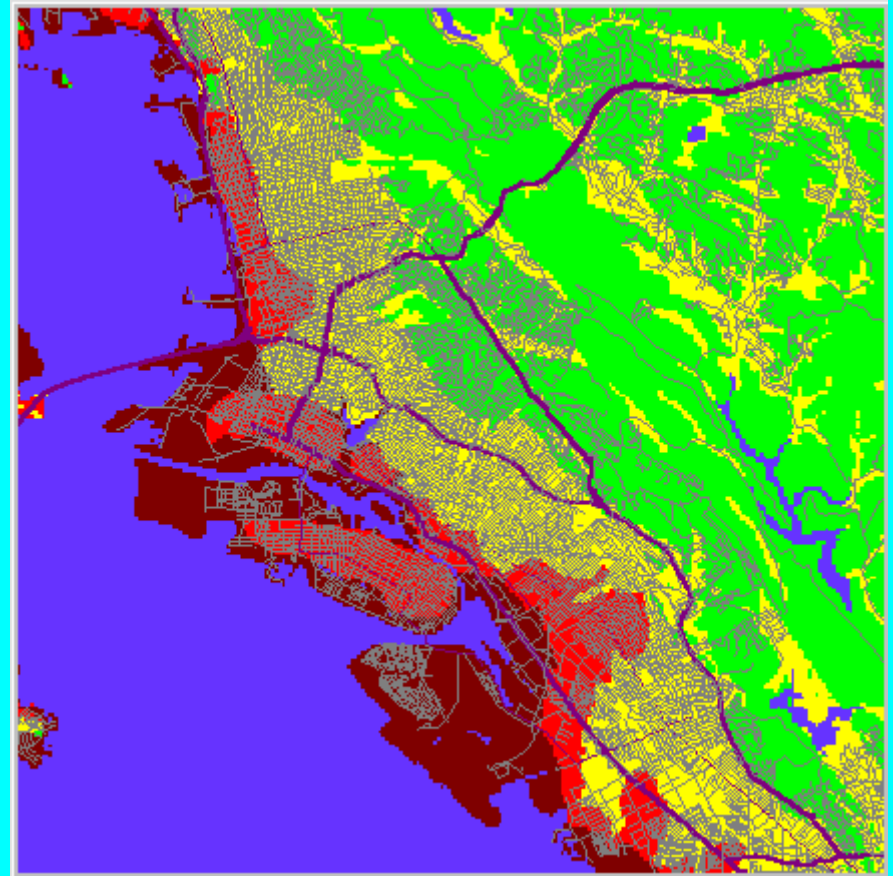
What Happens - M 7.9 on Entire Bay Area San Andreas Fault

- **159,900**
uninhabitable
housing units
- **359,000**
people displaced
- **105,700**
peak shelter
population



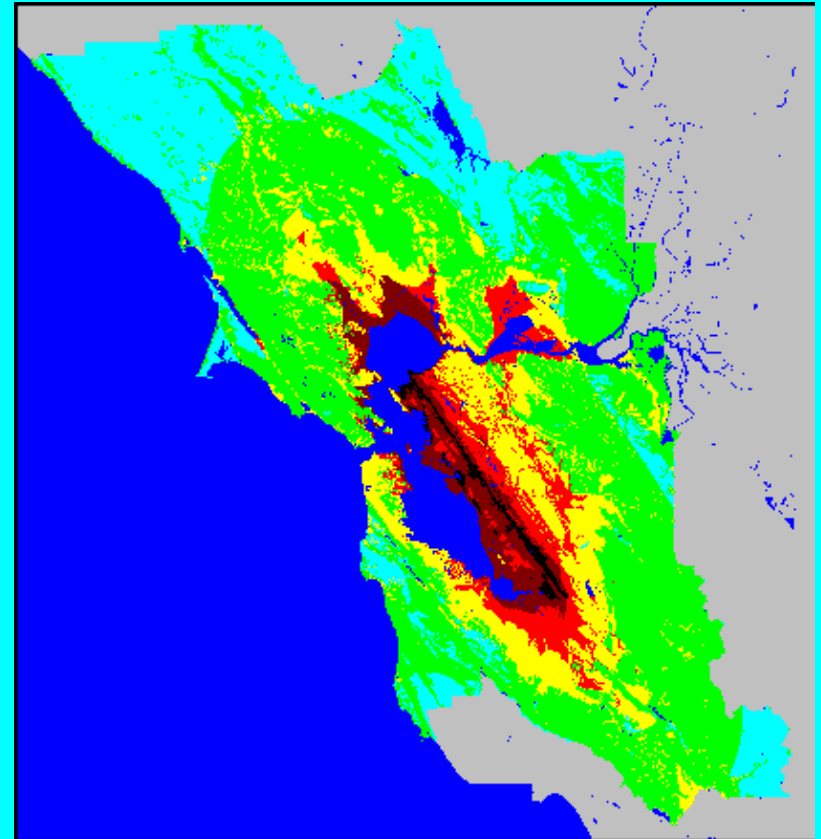
Uninhabitable Housing Units - M 7.9 on San Andreas in NW Alameda Co.

- **4,120** Alameda
 - **290** Albany
 - **760** Berkeley
 - **1,090** Emeryville
 - **7,570** Oakland
 - **2** Piedmont
- 9 % of “problem”**



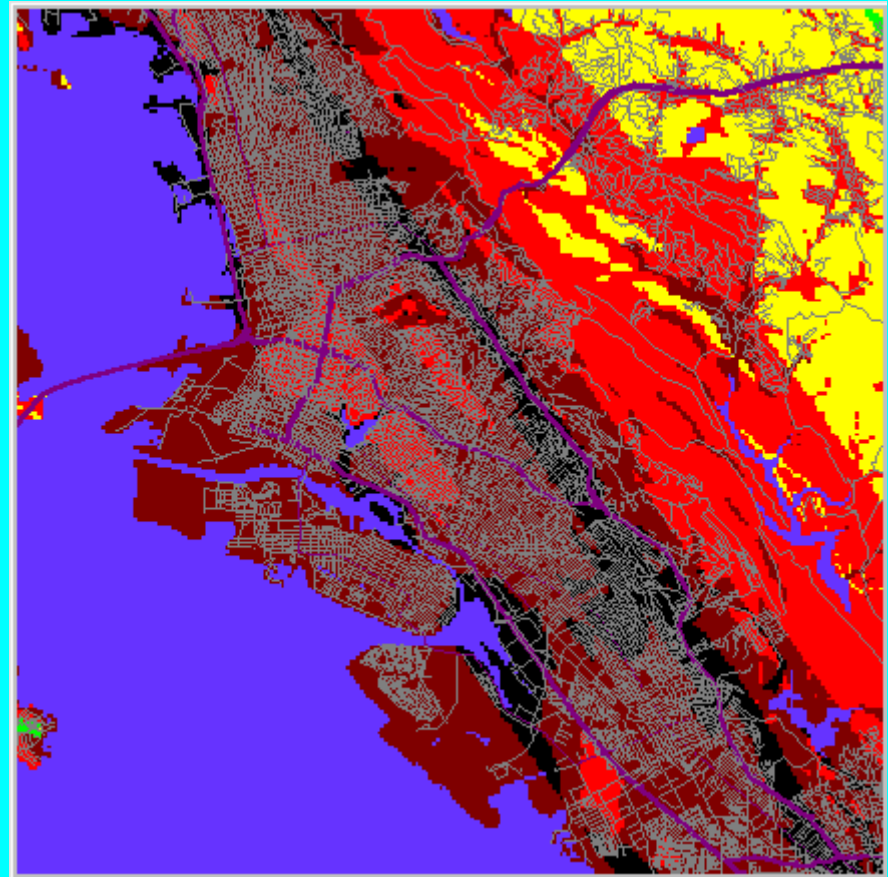
What Happens - M 6.9 on Entire Hayward Fault

- **155,700**
uninhabitable
housing units
- **356,600**
people displaced
- **110,300**
peak shelter
population



Uninhabitable Housing Units - M 6.9 on Entire Hayward in NW Alameda Co.

- **7,610** Alameda
 - **1,860** Albany
 - **14,730** Berkeley
 - **1,500** Emeryville
 - **36,480** Oakland
 - **470** Piedmont
- 39 % of “problem”**

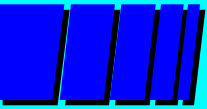




***Housing Problems
Vary by Building Type***

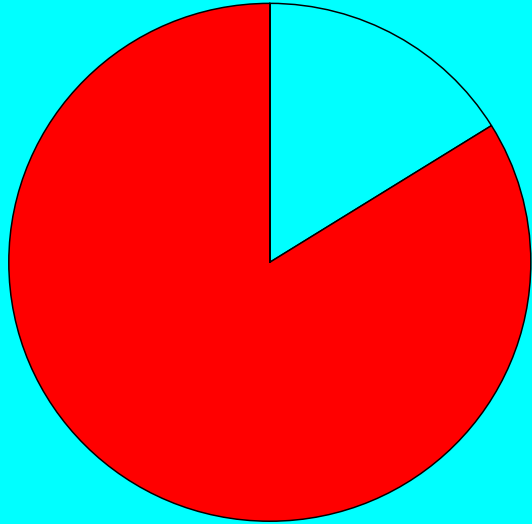
Vulnerable Housing Types





Multifamily vs. Single-Family

84% of the problem in the Hayward Nightmare

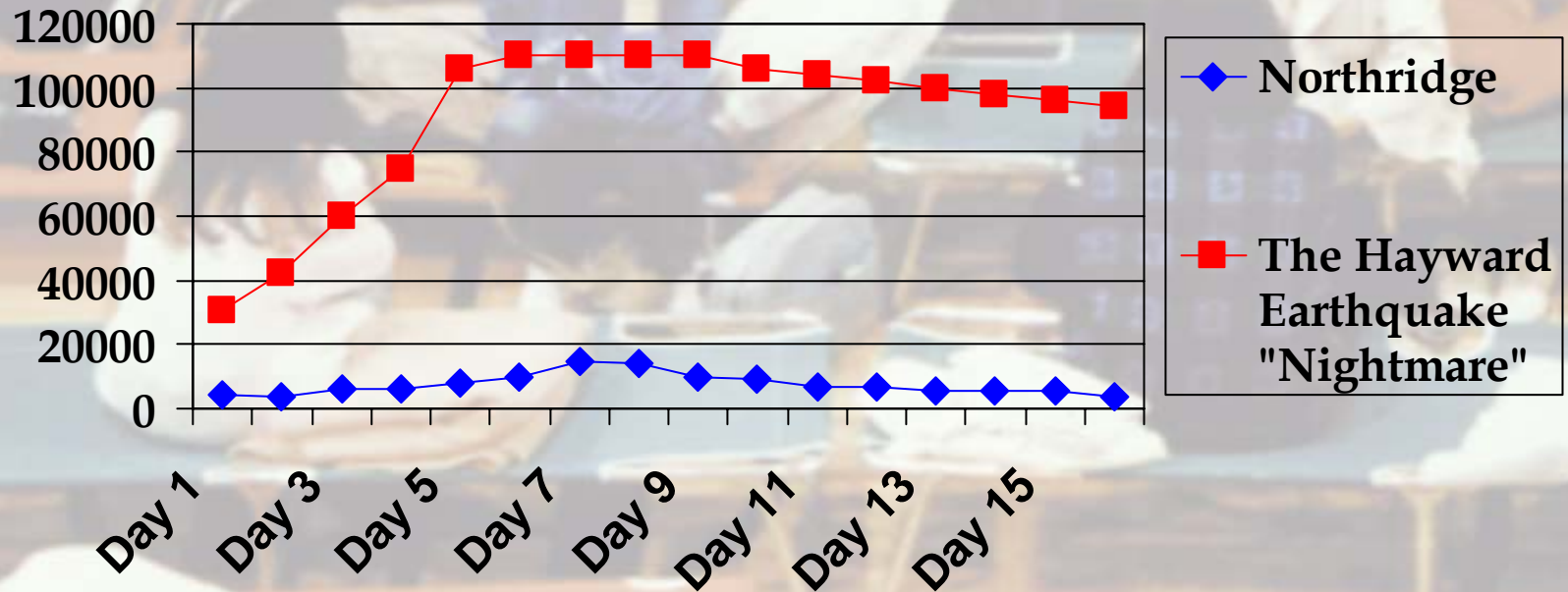


66% of the problem is soft-story buildings

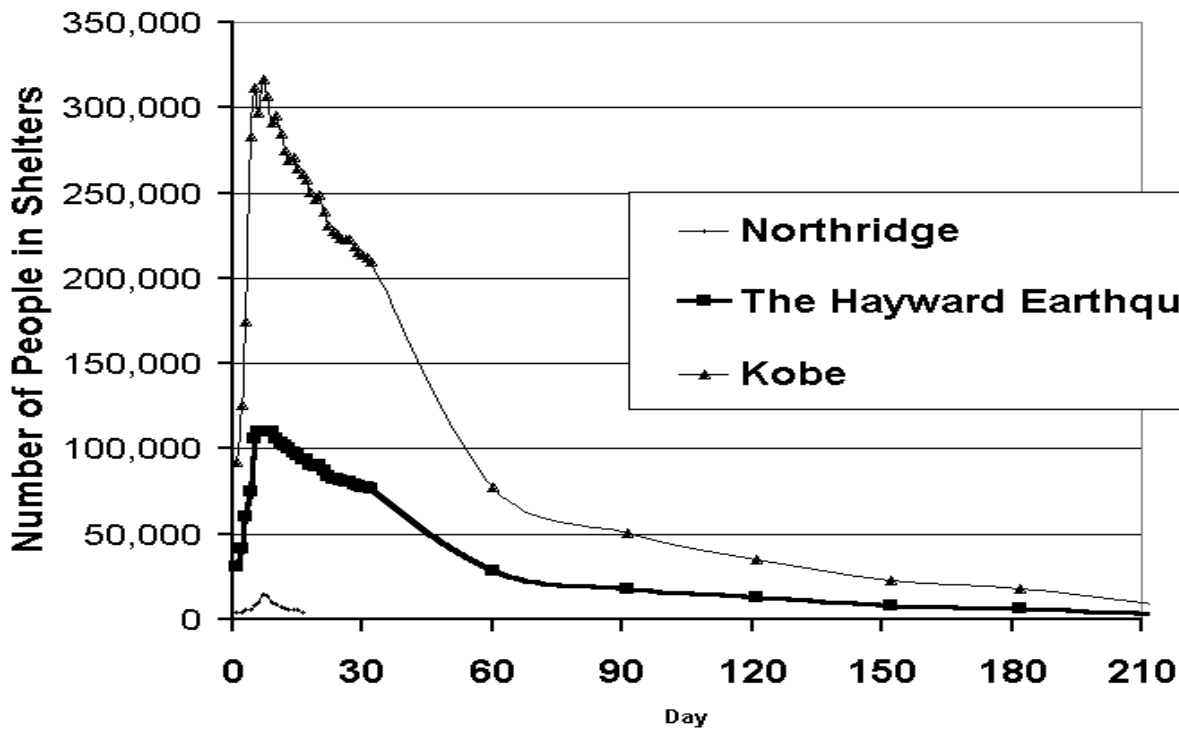


The Nightmare Goes On and On...

Peak Shelter Population



The Nightmare Goes On and On...





What Can We Do?

A Start =

ABAG Charrette

on Jan. 27, 2005



Who Came?


- **Structural engineers, architects, and contractors**
- **City and county building officials, planners, and elected officials**
- **One owner and one tenant**

Who Didn't Come?

- **Most owners and tenants**
 - **Bankers, insurance, and finance**
- 




Opportunities for Action - Multi-Jurisdictional Hazard Mitigation Plan

- **Get an accurate INVENTORY**
 - **Adopt retrofit STANDARDS**
 - **Work to EDUCATE owners and tenants**
 - **Require DISCLOSURE to tenants and upon sale**
 - **Adopt financial, procedural and land use INCENTIVES**
 - **Provide technical ASSISTANCE to owners**
- 




Opportunities for Action - Building Departments

- **Get an accurate inventory**
 - **Establish and adopt retrofit standards**
 - **Establish remodel and other retrofit “triggers”**
 - **Work with public policy to determine whether retrofits should be “live safety” or “property protection”**
- 





Opportunities for Action - Planning Departments - PAGE 1

- **Incorporate into mitigation planning and FEMA-required Local Hazard Mitigation Plans**
 - **Incorporate retrofitting into the HOUSING element, not just the SAFETY element over the LONG-TERM**
 - **Examine parking/zoning/density trade-offs as incentives**
 - **Take training on options**
- 




Opportunities for Action - Planning Departments - PAGE 2

- Advocate when examining both replacement housing and emergency housing
 - Use the creative “destruction” of redevelopment and redevelopment funds for incentives
 - Tax credits
 - Use transfer of development rights
 - Allow less setbacks to create opportunity for additional units as retrofit incentives
- 




Opportunities for Action - Private Structural Engineers

- Apply standards when designing retrofits
 - Take applicable training and continuing education courses to ensure state-of-the art design
 - Develop a way to show that, from a cost/benefit standpoint, engineer fees pay for themselves
 - Recommend retrofitting when given a remodel job, as appropriate
 - Require soils and geotechnical reports
 - Build “stick” models and create PowerPoint shows to show owners why these buildings collapse.
- 



Opportunities for Action - Private Architects

- **Provide more extensive training on designing for hazard mitigation**
 - **Examine ways to use alternative materials, innovative design of garage openings, and other ways to increase compliance**
 - **Become advocates for mitigation**
 - **Piggy-back on “green design”**
- 




Opportunities for Action - Private Contractors

- Take training to improve the quality of new and retrofit construction
 - Know when to call an engineer
 - Advocate a contractor specialty license
 - Work to reduce the liability issues disproportionately a problem for specialty contractors
 - Advocate retrofitting to owners
 - Work to help cities and others develop “buildable” retrofit standard
-
-




Opportunities for Action - Insurers and Bankers

- Offer insurance discounts and “carrots”
 - Require larger down-payments for unretrofitted buildings and other “sticks”
 - Refer to the EERI book on mitigation
 - Have ABAG, EERI, and others speak at economic conferences that these individuals attend
- 




Opportunities for Action - City & County Policy Makers

- **Tour soft-story buildings to understand issues**
 - **Look at photos of damage in past quakes**
 - **Start by preparing inventory**
 - **Then require cost and risk disclosure on sale of property and to potential tenants**
 - **When weighing costs vs. benefits of programs, look at potential impact on property tax base and assessment base**
 - **Work with staff to develop and share model ordinances**
- 




Opportunities for Action - State Policy Makers

- **Adopt mandatory retrofit standards**
 - **Require that local General Plan Safety AND Housing Elements address this issue**
 - **Allow more units without increasing property taxes for, perhaps, 20 years**
 - **Use the unreinforced masonry requirements for inventory and disclosure as a model for addressing this problem**
 - **Mail out hazard info with the renters credit refunds**
- 




Opportunities for Action - State Department of Insurance

- **Look at all hazards mitigation**
 - **Get the ISO (Insurance Services Office) involved to work with private insurers**
 - **Document the 3:1 benefit-cost ratio**
 - **Involve insurance underwriters**
- 



Opportunities for Action - ABAG

- **Talk with BOMA, elected officials on ABAG committees, and city/county emergency committees**
 - **Develop a model ordinance and/or distribute existing ordinances**
 - **Work with legislators re: legislation**
 - **Look at funds from seismic instrumentation fees as source of incentives**
 - **Track the efforts of various cities (Berkeley, Fremont, San Leandro, San Francisco, etc.)**
 - **Advocate that this program should build on city and county unreinforced masonry programs**
 - **Develop 2-page and 8-page handouts of the problem and potential solutions (including reference to past ABAG and EERI efforts)**
- 



***ABAG's Earthquake
Program Web Site -***

<http://quake.abag.ca.gov>

