

# UC Berkeley

## Working Papers

**Title**

Paying for the Big One

**Permalink**

<https://escholarship.org/uc/item/4681m4w7>

**Author**

Comerio, Mary C.

**Publication Date**

2000-03-23

Peer reviewed

**MARY C. COMERIO**

## **Paying for the Next Big One**

**Our system for financing recovery from natural disasters is in shambles. New policies that promote shared risk and responsibility are needed.**

The devastation caused by recent large-magnitude earthquakes in Turkey and Taiwan provides a chilling preview of what could happen in a major urban disaster in the United States. The damage to modern buildings and infrastructure cannot be simply written off as bad construction practices. For the first time in human history, we are approaching a moment when more people worldwide live in cities than in rural areas, and many of those cities are located in areas prone to earthquakes, hurricanes, and other natural disasters.

The United States' own experience with disasters in the past decade has focused some attention on pre- and post-disaster policy. After a relatively quiet century, major earthquakes, hurricanes, and floods have become more frequent, and urbanization has contributed to increased damage and dramatically increased costs for repairs. The five largest U.S. disasters between 1989 and 1994 caused \$75 billion in damage, half of it in residential structures. In just those five events (two earthquakes, two hurricanes, and a major flood), more than 800,000 housing units--approximately the number of housing units in metropolitan Seattle--were damaged or destroyed,

Because relatively few people have been killed in these disasters, Americans tend to underestimate the real risk of disasters. But Hurricane Andrew, which hit South Dade County, Florida, in 1992, and the Northridge earthquake, which hit the San Fernando Valley in California in 1994, were financial disasters for insurance companies, and each required federal appropriations 5 to 10 times greater than any previous events. Capital losses were about \$25 billion in each event. In both cases, half of the total losses were in residential structures, and in both cases, insurance paid for about half the losses, with the federal government picking up the difference. This does not include the indirect costs to business and individuals without insurance and/or access to federal programs. Analysts estimate the total price tag for each disaster at about \$40 billion.

These two suburban disasters demonstrated the potential for financial loss in a major urban event. If Hurricane Floyd in 1999 had hit central Miami or if a Kobe-caliber earthquake were to occur in San Francisco or Los Angeles, capital losses could easily range from \$50 to \$100 billion, four times those of Andrew or Northridge. Unfortunately, in the aftermath of those two disasters, the two primary funding sources for repairs--insurance and federal assistance--have

severely limited access to capital. Residential insurance has become expensive and hard to obtain, and balanced budget requirements now cap federal disaster spending. Thus, when the next disaster hits a major urban area, there will be no deep pockets to fund repairs.

Private insurance companies were shocked by losses from Andrew and Northridge, which drove nine companies into insolvency. Most companies no longer offer disaster insurance along with a traditional homeowner policy in California, Florida, and Hawaii. Coverage is only available through state-managed disaster insurance pools with high premiums, high deductibles, and limited coverage. Fewer than 20 percent of California homeowners carry disaster insurance now. Although there has been increased federal funding for disaster response and recovery, it was never intended to take the place of insurance. Between 1989 and 1998, the number of federal disaster declarations range from 29 in 1989 to 72 in 1996. Federal supplemental appropriations for disasters totaled \$35.5 billion, with \$6 billion in 1992 and \$8.4 billion in 1994, each reflecting large expenditures after Andrew and Northridge. Until 1996, these appropriations were designated as emergency funds and were therefore exempt from budget limitations. The 104th Congress changed that rule, and now supplemental disaster appropriations require compensating cuts from other domestic programs. Thus, although the public believes that insurance is unnecessary because the Federal Emergency Management Agency (FEMA) will be there to pick up the pieces, the reality is that the federal disaster recovery programs will be subject to political whims and partisan deals.

Who will now pay for the repair and rebuilding of hundreds of thousands of homes, apartments, and commercial buildings in a major urban disaster is an open question. With the cost of urban disasters increasing, private insurance is not available, government agencies are caught between the public pressure to do more and a congressional unwillingness to pay more, and property owners have no incentives to take actions that would reduce losses and costs. To bolster disaster recovery finance, new policies that promote shared risk and responsibility are urgently needed.

## **The Hayward fault scenario**

In 1999, the U.S. Geological Survey released research that suggests a 70 percent probability for a magnitude 6.7 or greater event in the San Francisco Bay Area during the next 30 years. In the 10 years since the Loma Prieta earthquake (magnitude 7.1, with the epicenter 60 miles south of San Francisco), the damage to freeways and bridges has still not been fully repaired. It is clear that in a magnitude 7.0 earthquake on the Hayward fault, which is closer to San Francisco, there would be widespread damage, including bridge collapses and mass disruption in the region's transportation system resulting from hundreds of road closures. Repairs could cost \$50 billion, six times more than the Loma Prieta repair program, and take longer to complete. Power outages would be widespread, telecommunications would be overwhelmed, and lifelines and critical facilities would be severely affected. Buildings of all types would suffer, but most important, housing damage could reach the levels experienced in Kobe, Japan, in 1995, where 400,000 units became uninhabitable.

According to reports by the Association of Bay Area Governments and my own research, more than 100,000 dwellings would be uninhabitable and as many as 400,000 could sustain some damage. In a region where rents and home prices are at a premium and vacancies are extremely

low, damage to one third of the housing stock in the counties closest to the fault rupture (combined with the business disruption and the inability to travel around the region) would create a social and financial disaster.

The potential for massive disruption is a function of the physical conditions in the region. The building stock and the infrastructure are old. The geography of the region has concentrated urban development between the hills and the bay, forcing limited transit corridors with little redundancy and creating significant distances between the urban core immediately surrounding the bay and outlying communities.

The potential for economic disruption is a function of the changing financial climate. Traditionally, the assumption of risk in any disaster was in the following order: owner, insurance company, federal government, and lender. Today, the burden is largely on the owner. Insurance availability is limited. The government is trying to reduce emergency spending. Lenders are selling mortgages in a secondary market and insuring themselves against owners who default, not against property damage.

## **The evolution of federal disaster policy**

The U.S. model for providing disaster relief and recovery assistance has always been a mixture of charity, private insurance, and federal programs. Before World War II, the Red Cross provided emergency relief to disaster victims throughout the country, and federal assistance was limited to specific appropriations designated for financial assistance to local governments on a case-by-case basis. After the war, federal involvement in disaster assistance grew with each succeeding disaster, but it usually was limited to providing a safety net that paralleled but did not substitute for charitable relief or private insurance.

The programs and policies that evolved over the course of a century are the product of the country's experience and lack thereof with certain types of disasters. Although some disaster relief acts were passed in response to specific floods and hurricanes in the 1920s and 1930s, the beginning of the federal role in supplementing state and private disaster relief efforts came with the Federal Disaster Act of 1950. This legislation laid the groundwork for the federal government to provide supplementary assistance to states, usually to support infrastructure repair or replacement. The losses of individual victims were not covered by this law.

After Hurricane Camille in 1969, Congress instituted an assistance program for individual disaster victims. Over the years, individual assistance has grown to include temporary housing, individual and family grants, low-interest home loans, long-term rental assistance, unemployment compensation, food stamps, crisis counseling, and legal services. In *Disasters and Democracy*, Rutherford Platt describes the past half century of federal laws and programs designed to soften the financial and social impacts of natural disasters as a transition from compassion to entitlement. He suggests that federal generosity has served to diminish the natural caution that individuals, businesses, and communities might otherwise exercise in adjusting to the risk of natural hazards in their investment and location decisions.

In 1988, the Stafford Act reorganized emergency management within FEMA but did not streamline previous legislation or change the activities of other agencies. Then, in September

1989, Hurricane Hugo, a category 4 storm, devastated large sections of eastern South Carolina. One month later, a magnitude 7.1 earthquake rocked the San Francisco Bay Area, severely damaging buildings in the cities of Watsonville and Santa Cruz and also destroying freeways, bridges, and housing in Oakland and San Francisco 60 miles away.

In 1991, wildfires burned 3,000 homes in the Oakland hills. In 1992, Hurricane Andrew slammed into south Florida, damaging 1,100 square miles, while Hurricane Iniki hit Hawaii. In 1993, the big flood on the Mississippi River affected communities in nine states, and more wildfires broke out in southern California. In 1994, the magnitude 6.8 Northridge earthquake struck in the San Fernando Valley in northwest Los Angeles. From 1995 to 1997 major floods hit California, North Carolina, Ohio, Minnesota, and North Dakota. In 1998, tornadoes left their mark across Texas and Oklahoma, and in 1999 Hurricane Floyd missed Florida but engulfed the Carolinas. Between the big disasters, there were scores of smaller ones. For federal agencies, there was unprecedented pressure to do better and to do more.

The most significant programmatic improvements came in the area of emergency response. In California, communication problems after Loma Prieta and the Oakland hills fire resulted in the development of statewide satellite communications and standardized emergency response procedures. The inequities and problems in sheltering low-income victims after Loma Prieta and Andrew led to a review of procedures by charitable and government agencies. Volunteers and staff were trained in cultural sensitivity, foreign languages, and specialized services. At FEMA, regulations were changed to allow federal agencies to take action on catastrophic disasters even before states officially requested help.

The housing recovery problems after Hugo and Loma Prieta were met with the standard range of services even though the scale of housing loss was greater than had ever been experienced. Homeowners were frustrated by the maze of programs, each of which required that an owner be rejected by one program before he or she could work through another application and inspection process. Lower-income homeowners often found that they were not creditworthy and were thus ineligible for Small Business Administration (SBA) loans. Apartment owners had equal trouble qualifying for SBA loans. Low-income renters could not find any alternative housing and often received no assistance because they could not produce a traditional lease. The post-disaster affordable housing problems were complicated by general problems of housing supply and affordability.

The Loma Prieta experience raised the federal consciousness about housing loss in disasters, and federal services were expanded. After Hurricane Andrew, disaster programs were combined with existing housing programs to help thousands of victims in south Dade County. FEMA provided more than 3,600 mobile homes and travel trailers, the U.S. Department of Agriculture developed mobile home parks for farm workers, and the Department of Housing and Urban Development (HUD) made 8,000 Section 8 rental vouchers available for victims and provided reconstruction funds through the acceleration of Community Development Block Grants and other funds.

It is not surprising then that within hours of the Northridge earthquake, in January 1994, HUD secretary Henry Cisneros was on an airplane to Los Angeles, ready to offer HUD's resources to assist with the problems of temporary shelter and reconstruction of damaged housing. The combined resources of FEMA and HUD quickly rehoused displaced residents of all income

levels. There were still no special disaster programs for the repair of multifamily housing, and apartment owners faced certain rejection by SBA loan programs, but HUD filled a significant gap with extra moneys in its funding programs. SBA made 99,000 loans to creditworthy owners of single-family homes, amounting to \$2.4 billion, one-eighth of the value of all its loans for the previous 40 years.

The entry of nondisaster agencies such as HUD, along with the continued expansion of disaster agencies into new areas, has been an attempt to solve the new problems posed by large-scale urban disasters. But compassion and politics have pushed federal disaster spending to new levels. The actual magnitude of federal spending on disasters is difficult to assess, because although FEMA accounts for its outlays under the Stafford Act, other agencies combine FEMA transfers with their own programs and resources. Still, of the \$6 billion in 1992 supplemental appropriations, at least \$2.2 billion was spent on Andrew, and of that, \$1.2 billion was spent on housing. Similarly, of the \$8.4 billion appropriated in 1994, \$4.7 billion was spent on housing by FEMA, HUD, and SBA, half in loans and half in direct grants.

The expansion of agency roles and the large expenditures have led conservative members of Congress from states outside the earthquake and hurricane belts to question the federal role in disaster assistance. In 1996, the 104th Congress offset supplemental appropriations for disaster assistance with cuts of prior domestic appropriations, including low-income housing and bilingual education.

## **Rising expectations**

The Loma Prieta earthquake was a big-time news event, in part because the national media was already in the area for the World Series and because the damage to the Cypress Freeway, the Bay Bridge, and the Marina district was particularly dramatic and photogenic. With the introduction of 24-hour cable TV news, Loma Prieta moved disasters into the same category as wars and (later) murder trials.

The constant broadcasting and updating of disaster footage intensified the politicization of disasters light-years beyond the ordinary dimensions of pork barreling. In response to every unchallenged tirade against the federal government for failure to deliver more services, federal agencies tried to improve their tattered images by offering more dollars and more services than ever before. President Bush promised to rebuild Homestead Air Force Base (leveled by Hurricane Andrew) in the midst of base closures around the nation. Although Bush could not make good on the Homestead promise, he paid all of Florida's cleanup costs instead of the customary 75 percent. He extended this largesse to Louisiana and Hawaii (after Hurricane Iniki), and when Senator Ernest Hollings (D-N.C.) complained, North Carolina was retroactively included. Only in California, where Bush was unlikely to receive additional votes, were funds allocated less generously.

In this era, gone was the notion that a federal declaration of disaster signified that state and local resources were overwhelmed. With TV cameras rolling, the federal government was the first on the scene, and in the public mind, the federal programs designed to assist victims in need were transformed into entitlement programs for aggressive individuals and local governments.

Constant TV broadcasting has forced the federal government to promise more and more assistance, and the visibility of those promises has built unrealistic expectations, especially now that disaster assistance is supposed to be traded off against regular domestic programs.

## **The insurance problem**

Just as disasters in the past decade have focused attention on government's role, they have also focused attention of the role of private insurance. Earlier in the century, the government faced the problem of having insurers leave the market because of repeated flood losses, which accounted for 70 to 80 percent of all U.S. disasters. The federal government first attempted to address flood loss through a program of flood control measures, such as dams, seawalls, and levees, begun in the 1920s. The first federal flood insurance was instituted in 1956, followed by the National Flood Insurance Program (NFIP) in 1968. Flood insurance was designed to serve as an alternative to disaster relief, and participation was tied to local mitigation efforts, but many communities did not and still do not participate, because local governments were and are unwilling to adopt any development regulations.

At the time of the Midwest flood in 1993, only 20 to 30 percent of insurable buildings were covered by federal flood insurance, and communities choosing not to participate in the NFIP received substantial assistance, despite regulations to the contrary. Since then, the program has been reorganized but problems remain. State and local governments are more likely to defer to real estate and development interests than to enforce good building and zoning practices. For its part, the federal government has a hard time refusing assistance to any disaster victim.

Nothing similar to federal flood insurance has ever been proposed for hurricanes or earthquakes. During this century, the infrequency and unpredictability of these events suggested that a combination of private insurance and one-time appropriations was adequate. The past decade has changed that view, but the only proposed remedy was a national multihazard insurance program, a proposal with few supporters. Most critics fear another government-sponsored insurance program would simply condone bad building practices and create a moral hazard, a situation in which an insured party has lower incentive to avoid risk because an enhanced level of protection is provided.

At the time of Loma Prieta, only about 20 percent of Californians had earthquake coverage as a rider on their home insurance. Why so few? The reasons are varied but generally included the following, published by Risa Palm from survey data:

- Homeowners did not think "it" would happen to them.
- Homeowners perceived premiums and deductibles as too high.
- Banks did not require earthquake insurance.
- Insurers did not market coverage, because it appeared underpriced relative to potential losses.
- Homeowners assumed that the federal government would come to their aid.

Despite the fact that California had required insurance companies to offer earthquake coverage with homeowner policies since 1985, purchases of the coverage did not increase until after the Loma Prieta earthquake. By 1994, more than 40 percent of California homeowners had earthquake coverage. With more homeowners purchasing the insurance, the companies saw their exposure increased, without adequate underwriting. The Oakland hill fires made insurance companies recognize the scale of potential losses. The insured value of many older homes did not reflect the replacement costs, and insurers faced tremendous pressure to settle for more than the policy value.

Even though insurers believed the product was underpriced and consumers thought it was overpriced, insurance companies were under pressure because the worldwide capacity for reinsurance had not grown with demand. Reinsurance is the insurance bought by insurance companies to protect themselves against extreme losses. Lloyds of London and Swiss RE are two of a small number of such global reinsurance companies. When Lloyds faced bankruptcy in 1992 and the market was concentrated in only a few companies, rate increases made reinsurance hard to obtain. Hurricane Andrew's insured losses were \$16.3 billion, and after the Northridge earthquake the insured losses were \$12.5 billion. In the Northridge case, the insured losses were more than three times the total direct premiums collected for all earthquake insurance policies in the United States from 1990 to 1993.

Raising rates was not the answer. Insurers preferred to leave the disaster market entirely. In California and Florida, private insurers quit offering earthquake or hurricane insurance as part of a homeowner policy. In each case, a semiautonomous nonprofit agency [the California Earthquake Authority (CEA) and the Joint Underwriting Authority in Florida] was created to offer limited residential disaster insurance coverage. These agencies do something a private company cannot. They provide a tax-free, state-backed reserve fund set aside over a period of years for disasters. However, these funds are relatively small (\$12 billion in California), so coverage is limited, making the policies unattractive for consumers. If CEA had been in place at the time of the Northridge earthquake, only about half of the payments would have been made to half the number of claimants. This is because CEA policies raise the deductible from 10 to 15 percent, limit contents losses to \$5,000, and limit coverage to the main structure only. Together these policy restrictions cut coverage dramatically.

It is a mistake to think that private insurance will never return. Lenders require it on commercial building loans, and small companies are beginning to target "good risk" customers with an alternative to state policies. But in order for private insurance to grow significantly, government will need to look seriously at changing the corporate tax law. Currently, corporations are taxed on their annual assets, so that a pool of reserve funds (for a future disaster) is taxed as an asset. Insurance companies find it impossible to create multiyear risk reserves for hurricanes and earthquakes if the fund is subject to annual taxation.

At the same time, insurers need to do the research necessary to better tie the price of disaster insurance to the real risks, based on location and building conditions. Insurers could also consider a variety of insurance products. Instead of a high-premium policy that covers catastrophic loss after the owner pays a \$30,000 to \$50,000 deductible, insurers might offer a "minor loss" policy, capped at \$50,000, to cover the typical minor damage and contents damage most homes experience after hurricanes and earthquakes. For insurance to make a comeback, it



needs to be part of a series of recovery options available to home and building owners, and not the sole source of recovery funding.

## **Predisaster mitigation**

Because of the limited availability of insurance and caps on federal spending, FEMA has advocated establishing "disaster resistant communities." Under this strategy, seed funds would be provided to cities to promote mitigation of either earthquake or hurricane hazards by building owners before disaster strikes in order to limit federal and personal recovery costs. In theory, this is reasonable, because there clearly are cases of individual buildings or bridges that have been retrofitted and thus spared some damage as a result. However, the success of individual projects does not necessarily translate into regional or national programs. Despite the fact that mitigation can reduce losses, it is clear from past experience that the real estate market does not reward a building owner for such expenditures in higher rents or higher property values.

Similarly, FEMA has a buyout program in which homes and property in flood-prone communities are purchased and converted to parks or wetlands. Although this program has been a success in a few small towns in Illinois, Wisconsin, and Oklahoma, most owners simply refuse to move or even elevate their houses.

For earthquakes, only brick buildings have been singled out for mitigation. In 1981, Los Angeles mandated that unreinforced masonry (URM) buildings be seismically retrofitted because of the overwhelming collapse hazard. In 1985, California passed legislation requiring all local jurisdictions to inventory and mitigate the URM problem. But cities had a hard time requiring property owners to undertake expensive repairs if they were unable to increase rents. No mitigation regulations have ever been proposed to retroactively require hurricane clips when a house is re-roofed, even though it is clear that most Florida houses were built without them. If mitigation by regulation is difficult, mitigation without incentives is almost impossible.

Mitigation advocates cite damage avoided as a social benefit, but there has been little exploration of who should bear the cost. It may be relatively easy to justify retrofitting a highway system that is publicly owned and maintained. It will be more difficult to justify any regulation that orders hazard mitigation in privately owned structures, when the cost to be incurred by individuals is intended for a public good. Is it reasonable to ask that every structure in California be brought up to some newer standard? If not all, then which ones, in what order of priority, and at what cost?

Mitigation as a concept is not always realistic in terms of engineering solutions. The development of seismic standards for existing buildings is relatively new and much debated. The technical standards are currently only guidelines and are far from being adopted as part of a universally accepted building code. The structural engineering community is promoting the concept of "performance-based design," in which a building owner designates how his/her building should function after an earthquake (such as immediate occupancy, repairable damage, or collapse prevention). Although engineers have met such performance standards in specialized new buildings, the technical capacity to actually retrofit an existing building to such standards is still being developed and tested.

Before any mitigation program is adopted as policy, a good deal more technical and economic research is needed. Standards and enforcement procedures for seismic improvements to existing buildings, infrastructure systems, and lifelines need further development, including definitions of vulnerability based on soil conditions, fault proximity, construction type, and maintenance quality. The quantification of risk needs to be improved by reassessing past losses, identifying statistically relevant risk types, and integrating the mapping of soil and building conditions. Serious economic evaluations of mitigation incentives and programs need to be undertaken as well as comparisons between the costs of mitigation and the costs of public and private recovery programs such as insurance and federal assistance.

### **Forging a new disaster recovery policy**

At first glance, the prognosis for any disaster recovery policy appears bleak, with little that makes political or economic sense. The costs incurred in the past decade as a result of disasters shocked the insurance industry and the federal government, and the first reaction of both was to limit future payouts. FEMA director James Lee Witt has tried to offer predisaster mitigation as a policy mechanism for reducing future costs, but there has been no systematic reevaluation of the problem of financing postdisaster repair and rebuilding costs after large urban disasters.

A new recovery policy incorporating realistic costs for urban disasters will require a comprehensive revision of the government's role, new insurance instruments, and the involvement of the lending community. For government, humanitarian disaster relief services ought to be separated from financing for repairs. After Northridge, SBA loans went to single-family homeowners, whereas HUD funds went largely to apartment owners and low-income homeowners. In both cases, existing nondisaster programs were used to finance and expedite recovery. This is a good starting point for future government involvement in recovery finance. Another opportunity would be to build on funding programs for nonprofit housing corporations and social service agencies. Tax credits and other forms of construction and management funding could be increased to allow these locally based agencies to take control of community recovery.

However, if government also wants to promote predisaster mitigation, it will take a combination of regulation and incentives. Tax credits are an obvious incentive, but they tend to go to those who would do the mitigation anyway. To reach a large number of homeowners and some apartment owners, it is important to devise a policy that taps into the real estate marketplace. What most of these properties have in common is a loan, but the lenders sell loans to other financial institutions, spreading their risk and keeping capital in their business. Consequently, in order to affect real estate lending, one must go not to the banks and savings and loan companies but to the secondary market--the Federal Housing Administration (FHA), Fannie-Mae, and Freddie-Mac (officially, the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation). These are the quasi-governmental agencies that underwrite and purchase residential loans.

A new role for mortgage underwriters might be to require building safety inspections in order to qualify for federally backed mortgages. The inspections could be based on an engineering rating system in which a rating change could lower the mortgage rate and perhaps even influence

insurance premiums. If the secondary mortgage market requires a safety inspection as part of a loan transaction, all lenders would be using the same information and would be able to price their loans accordingly. The same rating system could provide the basis for insurance rates for a variety of insurance products.

Instituting federal requirements tied to mortgage origination offers many financial advantages. For consumers, national standards would force all loan transactions to recognize disaster risk as part of the loan. For lenders, common rules would keep a level playing field. For private insurance companies as well as state-managed insurance pools, tying insurance to mortgage origination would guarantee sufficient participation and long-term financial capacity. There are also enormous political obstacles to both ambitious and modest interventions in the complex world of real estate mortgage finance, insurance, and tax codes. However, real solutions to funding postdisaster building repairs can happen only in the arenas where capital already exists.

Ultimately, any disaster recovery policy will require political commitment, but the economic future of California, Florida, and other hazard-prone regions depends on an anticipatory approach to policy and planning. As FEMA promotes mitigation as a cost cutter, the agency should promote policies to help insurance companies return to the market and promote programs that incorporate building safety assessments into real estate transactions. In the future, we need pre- and postdisaster policies that are safe, fair, and cost-effective.

## **Recommended reading**

Earthquake Engineering Research Institute (EERI), *Scenario for a Magnitude 7.0 Earthquake on the Hayward Fault* (Oakland, Calif.: EERI, 1996).

Peter May and Walter Williams, *Disaster Policy Implementation: Managing Programs Under Shared Governance* (New York: Plenum Press, 1986).

Risa Palm and Michael Hodgson, *After a California Earthquake: Attitude and Behavior Change* (Chicago, Ill.: University of Chicago Press, 1992).

Jeanie Perkins et al., *Preventing the Nightmare* (Oakland, Calif.: Association of Bay Area Governments, 1999).

Jeanie Perkins et al., *Shaken Awake* (Oakland, Calif.: Association of Bay Area Governments, 1996).

Rutherford H. Platt, *Disasters and Democracy: The Politics of Extreme Natural Events* (Washington, D.C.: Island Press, 1999).

Mary C. Comerio is professor and vice chair of the Department of Architecture at the University of California, Berkeley, and author of *Disaster Hits Home: New Policy for Urban Housing Recovery* (University of California Press, 1998).

Copyright © 2007. University of Texas at Dallas. All rights reserved. 800 W Campbell Road, Richardson, TX 75080-3021.

The original online presentation of this article can be viewed at <http://www.issues.org/16.3/comerio.htm>