Ordering Information

This Working Paper may be ordered from the Center for Urban and Regional Studies, Campus Box 3410, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3410. The charge is $10.00 which includes postage and handling. Please make payment by check or money order to the "Center for Urban and Regional Studies." For orders to be mailed outside the United States, remittance must be in United States dollars payable on a United States bank.

Mitigation Ethics:

Ethical Dilemmas in Natural Hazard Management

Contents

Acknowledgments

We would like to thank a number of individuals for giving their time and valuable insights. Most individuals interviewed for this work were located in California, Florida, or one of the Midwest flood states.

In California, the following people were interviewed: Tom Tobin, director (former) California Seismic Safety Commission; Shirley Mattingly, regional administrator, FEMA Region IX; Ken Topping, director of planning, City of Los Angeles, Richard J. McCarthy, California Seismic Safety Commission; Richard Andrews, director, Governor's Office of Emergency Services; Harry C. Hallenbeck, director, California Seismic Safety Implementation; Ronald Stork, Friends of the River; Richard Penny, Friends of the River; George T. Qualley, chief, Division of Flood Management, California Department of Water Resources: Butch Hodgkins, Sacramento Flood Control District, Rene Domingo, assistant Director, Oakland Emergency Services; Calvin N. Wong, deputy director, Office of Planning and Building, City of Oakland; Philip A. Grubstick, plan clerk/engineering services manager, City of Oakland; Anthony L. Atkission, vegetation management supervisor, City of Oakland; Jim Davis, California State Geologist; Ted Smith, California Seismic Mapping Project; Leo Levenson, FEMA Region IX, Laurence Kornfield, chief building inspector, City of San Francisco; Brook Skiff, special assistant for earthquake response, CALTRANS; Kip Wiley, special aid to Senator Tom Hayden; Judy Fugii, California State Legislature; Barbara Zeidman, City of Los Angeles Housing Office, Nick Dalliquadri, Los Angeles building and safety department; Fred Turner, Seismic Safety Commission; Jim Slosson, California Seismic Safety Commission; Hal Berson, Los Angeles city council; Paul Flores, California Office of Emergency Service; Laurie Johnston, Southern California Earthquake Center; Frank Borden, Los Angeles fire department; Lucille M. Jones, USGS; among others.

In the Midwest, the following people were interviewed: Jan Horton, Illinois Emergency Management Agency; Molly McGovern, Assistant City Manager, Excelsior Springs, MO; John McGovern, police chief, Excelsior Springs, MO, Michael Bathke, director of planning, Excelsior Springs, MO; Michael J. Bart, engineering and planning division, U.S. Army Corps of Engineers, Kansas City District; David Warford, Mayor, town of Pattonsburg, MO; Joseph Easton, Sustainable Economic Development Council, Pattonsburg, MO; Buck Katt, Missouri Division of Emergency Management; Denise Stattlemeyer, Green Hills Regional Planning Council, MO; Capt. Fehrel, U.S. Army Corps of Engineers, St. Louis District; Pat Glitherow, FEMA; Jim Zerega, St. Genevieve flood control project, Corps of Engineers; Gerald "Windy" Mairn, mayor, Grafton, Illinois; Dennis Knoblock, mayor of Valmeyer, Illinois; Tom Wobbe, executive director, Southwest Illinois Regional Planning Council; David Hertzing, Emergency Response Division, Illinois EPA; among others.

In Florida, the following people were interviewed: Maureen Gregg, Dade County Planning Department, Patty Metzker, Senior research associate, Florida Atlantic University/Florida International University Joint Center for Environmental and Urban Problems; Fred Murphy, Dade County Emergency Management; Billy Wagner, director, Monroe County emergency management; Bob Herman, director of growth management, Monroe County; Dan Evans, Florida Division of Emergency Management; James Murley, Secretary of the Department of Community Affairs; Joe Meyers, director, Florida Division of Emergency Management; among others.

Several research assistants devoted a tremendous amount of energy to the ethics project. Specifically, we would like to give special thanks to Maria Manta, Ramona Sein, and Leslie Smith, who worked on the project while students at the University of Virginia.

Mitigation Ethics: Ethical Dilemmas Natural Hazard Mitigation

Introduction: Ethics and natural disasters

Decisions about natural disasters -- planning for them, responding to, and recovering from them -- are ultimately questions of ethics, choices between different societal values of normative standards. These ethical choices occur in each place of disaster management -- pre-disaster mitigation, preparedness, response, and recovery and reconstruction.

One conclusion is that ethical judgments concerning natural disasters are exercised by a host of individuals and groups. Some choices are made by professionals involved in one aspect or another of disaster management -- policemen, firemen, search and rescue workers, architects and planners, engineers, and many others.

Other decisions are made by legislative bodies, from local city councils to state legislatures to Congress, which enact management policy and make a host of resource decisions about natural disasters. Still others are made by individual citizens, acting in their various roles of consumers, homeowners, etc. Ethical choices and dilemmas arise in each of these spheres.

We believe there is too little attention focused on the ethical dimensions of natural hazards and disasters. There is an extremely small (surprisingly so) amount of literature specifically addressing ethical dimensions of natural hazards (e.g. Partridge; ___; Beatley, 1989), and very little apparent discussion within the professional and trade literatures (e.g. Mucha, 1994). While some discussion of professional ethics can be found in the literatures of the disciplines involved in natural hazards, such coverage generally does not specifically address natural hazards (e.g. Howe, 1980; Howe and Kaufman, 1979).

This working paper is specifically about the ethical dimensions of mitigation. Mitigation choices made, in both public and private sectors, are fundamentally and inextricably about ethics. Yet, here as well there is very little literature or specific discussion of the ethics of mitigation policy or practice.

This working paper, consequently, is very much an exploratory effort; an attempt to at least expose and identify the key ethical dilemmas or quandaries faced by those involved in hazard mitigation, and hopefully to help clarify the nature of these quandaries. And, in the end it is hoped that this discussion will lead to more informed, reflective and ethical mitigation policies and actions.

Research methods

The findings reported in this paper are the result of two interrelated Natural Science Foundation funded projects. The

first, "Ethical Issues in Natural Hazards Management (Timothy Beatley and David Brower, principal investigators), and funded by the Ethics and Values Program, was intended to be a preliminary and exploratory study of the types and nature of ethical issues and quandaries that tend to arise with respect to natural hazards and natural disasters. It was decided that the primary method to identify and understand these issues could be to examine in great depth several recent disaster events. Specifically, case study visits and interviews with key individuals and groups were conducted for three of the most significant U.S. natural disaster events to date: Hurricane Andrew (1992), the Midwest floods (1993), and the Northridge earthquake (1994). Each was a devastating event that offered unique opportunities to understand the major ethical and policy quandaries that faced a variety of individuals, groups, and institutions. In addition to extensive interviews, a literature review was conducted, and an extensive analysis of media and newspaper coverage was also undertaken, to ensure that a full catalogue of ethical issues would occur.

To a lesser extent, several other disaster events, and hazard controversies were examined and are drawn from in the following paper. These include the Loma Prieta earthquake (1989), Hurricane Hugo (1989), the Oakland firestorm (1991), and the Auburn Dam/American river flood control debate (still ongoing). Together these events provide a rich mosaic of moral and policy dilemmas and should, we feel, lead to a fairly complete and full discussion at least of the type and variety of ethical issues that tend to rise.

Work on a second National Science Foundation-funded project, "Assessing the Implementation of Stafford Disaster Assistance Act" (David R. Godschalk, principal investigator), has also nicely dovetailed the first project and the findings from the second have been incorporated here as well. The second project, while specifically focused on mitigation, also involved extensive case study work, including additional work on the same three primary natural disaster events (among a larger set). Much of the work on these two projects began to merge in the spring and summer of 1996, and with this working paper representing a joint project of both projects.

Overview of findings: Ethical dimensions of mitigation

Several general findings can be identified before describing and discussing the more specific categories of ethical issues confronted in natural mitigation. Our findings, in conducting extensive interviews with public officials and others involved in mitigation (and indeed natural hazards management more generally), suggests first that there is considerable variation in the perception of whether ethical issues are important or even present in natural hazards policy. A number of individuals interviewed exhibited the reaction that ethics had little to do with natural hazards and were perplexed at the nature of our inquiries. Others, however, made immediate connections to ethics and perceived the

dilemmas and policies issues they confront as fundamentally ethical in nature. While some variation is a matter of semantics, it was clear that there were great differences in the ways in which individuals percieved and framed mitigation policy questions.

Whether or not the interviewees acknowledged the ethical dimensions, we found that ethical and moral concepts and language pervade mitigation. Professionals and policymakers commonly used language like "we have obligations to do ....," "They deserve to have ...," "That individual was wrong not to have done this ..." The process of making mitigation decisions, and the nature of mitigation policy, clearly involves extensive values judgments, though they may not always be seen or acknowledge by participants in the mitigation process as such.

Moreover, we found many instances in our examination of these disaster events where there was considerable personal (and institutional) judgment exercised. Whether it was a damage inspector determining whether a home was damaged beyond inhabitability, or a program administrator making a determination about eligibility, there are numerous instances of what might be described as "street level" mitigation decisions (i.e. the exercising of situation-specific discretion and judgment).

From the interviews and mitigation case studies, a number of broad categories of ethical issues have emerged. The discussion to follow is organized around these categories. The attempt in this working paper (and the research as a whole) is not to provide a definitive discussion of the ethical dimensions of mitigation, but rather to present an initial identification and exploratory discussion of them.

One of the conclusions is that ethical dilemmas and judgments are faced by individuals assuming a broad range of societal roles. For the purposes of this paper, we consider and discuss such roles as they relate to mitigation primarily. An important set of roles are professional, and the building and design professions in particular are seen to have serious and important responsibilities, and confront difficult questions about how to practice their respective disciplines in morally responsible ways. Many other roles can also be seen to have ethical dimensions to them as well--housing consumers, politicians, program administrators, business leaders, and scientific and technical experts, to name a few. There are many roles, then, relative to hazard mitigation, where some amount of ethical responsibility seems to attach or be implied. Some of the ethical dilemmas confronted in these different roles, and the different ideas about what their respective moral duties are, are discussed in the sections to follow.

It is apparent from our case study work that hazard mitigation occurs in a morally diffuse environment--that is, in answering the question "who is responsible" for safety (mitigation), at least in the U.S. context, there is no simple

ought to be taken in to account in making them. Are the interests of future residents, for instance, or future generations morally relevant in making mitigation decisions? This is often described by ethicists as the question of how the "moral community" is determined or defined.

Process issues are important as well. Who is consulted, and through what means, in making mitigation decisions? Are mitigation actions taken in a democratic, participative fashion, in which potentially-affected individuals and communities have a direct say in mitigation decisions?

Ethical aspects also arise concerning the methods by which mitigation decisions are arrived at, and the methodological tools and knowledge inputs to such decisions. Benefit-cost analysis, for example, is frequently employed in making decisions about mitigation, and for choosing between different mitigation options, yet it involves significant ethical assumptions and biases, sometimes not apparent or explicitly considered. Making mitigation judgements and policy in the face of serious technological and scientific uncertainty also raises serious dilemmas.

No attempt is made in this paper to present any broad or overarching ethical framework, and there is little background discussion of general ethics or traditional moral or ethical theories. Such discussion can be found elsewhere (e.g Frankena, 1973.....Beatley, 1994).

A final section identifies the conclusions of this research in terms of a series of preliminary ethical principles that should at least be considered in developing and implementing mitigation programs and policies--what might be called "mitigation ethics" (or "ethical mitigation"). While there will undoubt2edly be a disagreement about specific ethical choices and value priorities, the principles presented will likely be acceptable to most involved in mitigation policy.

Professions and professional ethics

One of the clearest conclusions of our case study work is that there are a variety of different professions involved in mitigation, and more generally involved in decisions and activities that influence the safety of people and property. A number of different professions are involved, for instance, in the building and construction of homes and other structures, each with opportunities to enhance the structure integrity and safety of these buildings. The list of different professions involved in designing, planning and building is a long one, and includes: architects and engineers (including structural engineers, civil engineers ...), geologists and engineering geologists, building code officials, planners, and contractors and developers (though strictly speaking the latter may not be considered to be professions). (See table 1).

Each profession has a hand in influencing the ultimate safety of buildings and development patterns, and each could

be said to have certain moral responsibilities that accompany their professional practice. While we did not conduct an exhaustive study of these different professions, there is a rich landscape of professional organizations with many having prepared and issued formal professional codes of ethics or codes of professional conduct. (1)

Table 1

Professionals and Professional Organizations
which exercise potential influence on mitigation

Professions:	Professional Organizations:
Architects	American Institute of Architects
Structural engineers	National Society of Professional Engineers
Consulting engineers	
Civil engineers	American Society of Civil Engineers American Public Works Association
Engineering geologists	Assoc. of Engineering Geologists
Geologists	
Land use planners	American Planning Association American Inst. of Certified Planners
Building code officials	Council of American Building Officials International conference of Building Officials
Real estate agents?	

In discussing the nature of professional responsibilities, a repeated observation made by those interviewed was that building and design professionals have gradually retracted from exercising a strong sense of professional responsibility. Increasingly it seems that the tendency is for each individual to define their professional role as narrowly as possible, and to avoid taking responsibility for the ultimate safety of a building or site (and contrary to many of the codes of ethics).

Each of the disaster events examined here tended to confirm the sense of retraction of professional responsibility, and appear to confirm the limitations of a building and development system where ultimate responsibility is confused and uncertain. Two grand juries were convened following Hurricane Andrew and their reports are a strong indictment of a building system there where responsibility is avoided, and where shoddy workmanship and unsafe buildings are the result. The grand juries spread blame widely and decsribe a building system in which inspection and enforcement is lax, construction practices questionable, and where architects and engineers fail to take steps to ensure that structures are built according to plan and code. In the strong words of the first of these grand jury reports: "In short, what has evolved is a building profession that no longer is held to a standard of professionalism. This lackadaisical approach to regulation and professionalism by the industry itself and by the government which regulates it, is no longer tolerable" (Dade County Grand Jury, 1992, p.14). (2)

And some stories were related of professional practice that interviewees described as "unscrupulous." For instance, we heard the story of some architects (and others) who had volunteered to help with damage assessment following the Oakland firestorm, handing out business cards to propertyowners and using this as an opportunity to solicit business.

But if professional duties and obligations exist, there remains the question of what more precisely these obligations are. The interviews and case studies highlighted several areas where potential agreement exists.

Some professionals interviewed employed a strong moral obligation to the public, and to protect public safety. And indeed, the language of the professional codes of ethics tend to strongly endorse this ethics of public safety. The "Principles of Ethical Behavior" of the Association of Engineering Geologists, for instance, states for instance: "Engineering Geologists have a responsibility to promote the public health, safety and welfare by applying their specialized knowledge to mitigate geologic hazards and geologic constraints." (Association of Engineering Geologist, 1985, p. 1). Other codes make similarly strong statements.

The "Code of Ethics" of the Council of American Building Officials speaks of the protection of life, health and property being "a solemn responsibility of the highest order," a "trust" bestowed by the public. The code states that the

certified building official shall "place the public's welfare above all other interests and recognize that the chief function of government is to serve the best interests of all the people (Council of American Building Officials undated). Precisely what this means or requires in practice is not clear, however.

A strident view of this professional duty is that individuals have an obligation to be active advocates of public safety, as well as promoting safety in daily practice. As the Council of American Building Officials Code of Ethics states, building officials shall "recognize the continuing need for developing improved safety standards for the protection of life, health and property, and acknowledge a professional obligation to contribute time and expertise in the development of such improvements." (Council of American Building Officials, undated).

In San Francisco, one of the recent tests of professional ethical standards has been the debate over the city's new URB (Unreinforced Building) ordinance. Largely as a result of concerns about the impact of the ordinance on Chinatown residents and businesses, a weaker retrofit standard was adopted (a lower standard than required when substantial renovation or change or use occurs). While there are understandable concerns about the effect of the ordinance on raising rents, and displacing low income residents, the result is that, according to Laurence Kornfield, chief San Francisco building inspector, buildings are being retrofitted to an unsafe standard, at least by current professional standards, and prevailing practices in other communities. Particularly distressing to Kornfield and to others was the silence of the Director of Building Inspection (his boss). Kornfield believes professional obligations extend to strongly and adamantly promoting public safety and taking a necessary stand when unsafe practices are being condoned. (At least one building commissioner did resign in protest.)

One issue involves the active avoidance of responsibility. We heard stories, for example, of engineers who chose not to inspect building sites out of a fear that this would open them up to future liability challenges should a building later fail (and they were advised to follow this path by their insurance companies) . Most thoughtful professionals we talked with, though understanding why such liability-limiting actions might be taken, saw it as professionally inappropriate and unethical to actively avoid opportunities to ensure that buildings were actually being constructed to plan, and with appropriate building materials and methods. There is a sense among some that each profession must begin not just to stop avoiding responsibility, but to proactively assume greater responsibilty for ensuring safe buildings and environments.

Related to this question, of course, is the broader question of who ultimately is responsible for the safety of a building, site or community. And, in this broader sense there are numerous other individuals and groups who could be said to have some degree of responsibility, including for instance,

the housing consumer. (These questions are discussed in greater detail in a section which follows).

Another response is that professionals are at least obligated to abide by the law. This often translates into designing and building according to whatever the prevailing code is. Many professions (indeed many citizens, politicians, etc.) tend to define what is ethically required by what is legally mandated. But as many recent disaster events have shown, building codes are usually minimum codes, and do not usually protect against major disaster events, and may not be safety standard professionals should aspire to or advocate. Professionals are required to at least meet the minimum requirements of the law, though some of those we interviewed clearly believe that adhering to the law had served to eclipse consideration of broader ethical duties.

Clearly there are other professional values that inhere in particular professions and roles that may not be explicitly acknowledged in a code of ethics. The engineering field generally, and subfields like civil engineering especially, has historically reflected a sense that nature and natural forces could be commanded and controlled. Historic reliance on levees and flood control structures in riverine environments, and seawalls and shorehardening structures in coastal environments, reflect the importance of an "engineering ethic." Such an ethic could be described as arrogant in its belief in the engineering abilities of the human species and in the superiority of engineering solutions even in the face of high financial and environmental costs.

The substantive ethics of professions, however, clearly change in response to changes in social values. Civil engineering, for instance, is today practiced with much greater attention paid to environmental concerns than previously (though still not sufficient to many). Interestingly, the July (1996) issue of the magazine of the American Public Works Association is devoted to environmental and sustainable development topics, and the cover features a highway in Hawaii that "lies lightly on the land." (see APWA, 1996).

Another issue involves when the professional believes he or she is qualified to assume a design role, and judgments about when one's professional competencies or qualifications are exceeded. State licensing boards deal with this to some degree, but certain professions (e.g. architects and engineers) are legally allowed to design almost any type of building or structure. The commercial end of one's practice may tempt design professionals to take on projects for which they are not fully or adequately prepared.

Professionals involved in design and mitigation may also face conflicting duties. Under the California seismic mapping program, those wishing to develop within say, a delineated liquefaction zone, will need to prepare a geotechnical report. These reports are intended to explore in more detail whether hazardous conditions exist and what mitigation and design actions could be taken to address them. Typically such

requests are prepared by either consulting engineers or engineering geologists. Under current California law, the client commissioning the report is not required to submit it if the results are not to his liking. The client can have as many reports prepared as he can afford, until the right conclusions are reached. And, apparently, duties to the client forbid the consultant from sharing her findings or opinions with government. In this way, a consulting engineering or engineering geologist may feel conflicted obligations -- at once acknowledging duties to the client and to ensuring the safety of the general public.

Much of the discussion about professional responsibilities has tended to center upon the full and complete disclosure of information to clients, and the duty to discuss and inform about options. As a matter of practice, however, this has not always happened. Architects and engineers have been accused in California, for instance, of failing to adequately explain to building clients that designing and constructing to mandated seismic standards will not ensure an economically viable building following an earthquake. Current seismic standards are intended to protect safety (i.e. to prevent the buildings from falling down), but many building owners appear not to understand that to ensure a usable building, additional seismic strengthening is required.

Interestingly, the California legislature is considering mandating that precisely this conversation take place. Specifically, proposed legislation would require architects and engineers to disclose to their clients that they are designing building to "code" and that in the event of an earthquake the building may not be economically usable. The client would also be given a list of possible technologies and mitigation techniques that could be used to make the building stronger. Once given this information, the building owner is left to decide what the appropriate building performance should be.

The professional reward structure may also not serve to encourage mitigation. In architecture, for instance, public attention and acclaim for one's aesthetic designs, and publications of ones work in architecture journals and magazines, tends to focus on the visual. Few professional accolades are given to designers who design and build something that survives a major earthquake. And in a climate of cost-savingand where choices must be made between, say, additional seismic reinforcement and a more spectacular building facade, the latter will often prevail. This suggests the importance of modifying the professional reward structure so that ethical-mitigative design practice is encouraged (or at least not discouraged).

Professionals must also confront the question of how and when they separate their professional judgments (or scientific, or technical judgments) from their personal judgments about the acceptability or appropriateness of a project or development proposal. Coastal geologist Orrin Pilkey, for instance, is sometimes criticized by his geological and scientific colleagues for failing to disentangle and separate

these judgments. It may be his professional opinion that the beach will erode at a certain rate, but his personal judgment that building on that beach is inappropriate or unethical. Sorting between these judgments is difficult, especially in light of the stated duty to protect and advance public safety (as in the example of the San Francisco retrofit ordinance).

There is an understandable tension in the design professions between designing safe and exemplary buildings and sites, and the need to earn a living. As several people noted, in a competitive capitalist system, a concern for safety may be secondary to the selling of professional services. A consulting engineer or engineering geologist who develops a reputation for being overly stringent in her assessment of geological hazards, and in design recommendations, may find that she has relatively little work. Contrary to this concern, a recent article in Civil Engineering which asks the question: "Is it necessary to compromise engineering ethics to remain competitive in today's marketplace?", answers in the negative. (see Mucha 1993). While this author is vague about why this is the case, there are clearly some clients who would prefer and seek out the services of professionals that are known to have high ethical standards. In either event, professionals will likely have to balance the demands of earning a living with the demands of high standards of ethical practice.

In the design of most major buildings peer review by an objective third-party panel of experts is common. We heard from a number of people how important peer review is, but also concerns about how objective it really is. Several interviewees pointed to possible biases in the composition of these review teams, and the difficulty in arranging truely objective peer review where the pool of professionals in specialized design areas is often small to begin with.

There are a variety of other professions involved in mitigation and recovery, often as consultants, often following a disaster event. We heard of some consultant practices that were described to us as "fraud." One interviewee described the excessive billing practices of a contractor doing documentation of historic buildings following the Midwest floods (the process of "re-coredating"). In some cases the cost charged by this consultant exceeded the market value of the home (averaging $20,000 per home). In contrast, he believed a local historian would have been willing and able to do the work for a fraction of the cost.

Who is responsible for safety?

A recurring question is who ultimately is responsible for ensuring the public safety of a structure or site. Many of the professions described above clearly have some of this responsibility, and clearly have a public duty that attaches to and flows from their professional status.

But are other groups responsible as well? An architect or engineer will simply not have the opportunity to propose a

design or retrofit plan unless the building owner (say of a URM structure) makes the decision to undertake these improvements in the first place. And, ultimately such may not be forthcoming from the building owner without a (very) strong push from government, i.e. the form of a mandatory retrofit requirement.

Retrofitting structures, however, is a significant expense that must be borne by building owners and merchants. And should they be held responsible for the safety of their occupants (i.e. tenants, businesses)? Is it unethical for a building owner or merchant to operate a business in which people frequently enter and leave a structure that is likely to collapse in an earthquake?

Retrofitting and questions about who should bear the cost of these seismic improvements, are controversial topics in California. Many building owners are objecting to the costs involved and the fairness of requiring them to absorb these costs: As the president of the Apartment Owners Association of California has recently said (Wexler, 1996):

> People are already losing their buildings left and right because of foreclosures. They've already been beaten up. To hit them with this --there are people who will lose their buildings ... It may be hard and cruel, but how can apartment owners be asked to save all these lives.

Perhaps it is not the apartment owners responsibility to "save all of these lives," but ultimately the responsibility of individuals? Some believe, and have expressed to us, that much greater emphasis must be placed on personal responsibility. And, a number of recent reports suggesting reforms to the current mitigation framework reinforce this theme (e.g. see Forbes, 1996; National Science and Technology Council, 1996; FEMA, 1995; U.S. House of Representatives, 1994). Individuals could be expected, for instance, to more fully and completely understand the structural integrity and seismic vulnerability of homes that they purchase. They could be expected to spend more time and energy understanding the site on which their home is built, whether it is in a floodplain, on a seismic fault, or in an area subject to landslides.

And, personal responsibility in mitigation is more than being informed, and more than making the right decision about purchasing a home. There are frequently many more active things that individuals can and should do to protect themselves and their property (e.g. installing shutters in coastal areas, bolting structures to the foundation in earthquake country, etc.). The Oakland firestorms of 1991 illustrate well the potential role played by personal responsibility. Much of the ferocity of the event there was a result of uncontrolled vegetation growth around homes. Ensuring a vegetation-free firezone around one's home is a critical action that each landowner can take to reduce the threat of such disasters in the future.

Of course for individuals to make responsible decisions and choices they must have reasonably good information. There seems considerable consensus that there is an ethical obligation to inform citizens and prospective homebuyers of the exposure to natural hazards. The Alquist-Priolo Act has since 19__ mandated that prospective buyers of property within mapped fault rupture zones be informed of this fact. Interestingly, not until 198_ was the law changed to require that the word earthquake be used in this disclosure process, and so even with disclosure required it may not lead to a fully informed consumer or citizen. (The State of California has recently embarked on an even more ambitious statewide mapping project described in a later section.)

There are clear limits, moreover, to a disclosure approach. Few individuals with an architectural or engineering background, would likely be able to look at a prospective home in South Florida and be able to assess its likelihood to fail in, say, a category four hurricane. In this sense, government must be responsible to some considerable degree for ensuring safe buildings, and building codes and construction standards can serve this function.

And, individuals may also be conflicted about where, ultimately, to expend their limited financial resources. Society may encourage them to, for instance, spend money on the features of their home that are most outwardly visible or useful in the short run. One builder recently described the decision dynamic of homebuyers in this way (Mayer, 1996, p. E4):

> My feeling is if you poll homebuying consumers and ask if they would be willing to spend X amount to improve the structure of their homes, they will all say yes. But when it comes time to sign on the dotted line, there will be a lot of conflicting demands. Will they spend their money on stronger connections to the foundation or for a beautiful Corian countertop? The problem for consumers is they can't bring relatives or guests into their homes and say 'Look at the beautiful connections to my roof'.

If housing consumers choose the Corian countertop over a stronger roof connection and do so fully informed of the implications (and the costs associated with this choice are internalized), that may be one thing. But to expect individuals to be concerned about the latter as much as the former will likely require active encouragement by government, and again more aggressive education programs.

In part what is also highlighted here is the (inherent) tension between the needs, interests and wants of individuals, and those of the broader public. There is no question that many individual mitigation actions and decisions have public or collective consequences--failure to control vegetation around one's home in wildfire prone areas (witness the Oakland firestorm) serves to undermine the safety of the entire community (not to mention the lives of fire control personnel and rescue workers). Failure to ensure the structural integrity

of one's home--say by installin shutters, hurricane clips, etc.-- may mean that in the event of a hurricane or storm resulting debris works like a battering-ram, damaging other homes in the community. Does the individual, or more appropriately should the the individual, take into account these public or external effects when making mitigation decisions? Most ethicists would reply in the affirmative, yet the cultural milieu in which individuals make such decisions today is very much one that stresses individualism (egoism?).

Other entities or actors that could be judged to have some moral responsibility here, include for instance, banks and mortgage companies, and insurance companies. Incentives could be provided for individuals (e.g. lower mortgage interest rates for better built homes, lower insurance rates for good design), and perhaps these entities have a moral obligation also to take direct action to disallow risky behavior (e.g. disapproving a mortgage for a home to be built in a floodplain).

The performance of the construction and building trades has been an issue in each of the recent disaster events examined, raising special questions about their ethical duties. Building contractors exercise numerous and daily ethical judgments about what types of materials to use, how much supervision and oversight to exercise and where to cut construction corners (are workers really putting in the requisite number of nails?), etc. It is not clear that contractors, and the construction industry generally, feel an ethical obligation to produce a quality (and thus safer) product. Shoddy construction was especially implicated in the damages from Hurricane Andrew and the Northridge earthquake.

To expect a higher standard of practice, requires that builders and contractors be equipped with the necessary knowledge to be more ethical and responsible. Projects like "Blue Sky," funded in part by FEMA, which aim to show how simple building technologies can lead to much stronger homes, and at modest additional cost, are positive steps (see Mayer, 1996). Before a builder can begin to understand her ethical duty to use six nails to attach roof tiling, rather than the conventional four, she has to have the training and knowledge to see this as a practice which will substantially strengthen a house or building in the face of hurricane forces.

One particularly difficult question is whether government has the responsibility (i.e. the moral duty) to keep people from occupying hazardous locations. There is a feeling on the part of some that government indeed has an affirmative obligation to prevent such exposure, beyond simply informing individuals of the possible hazards. Especially wherever governments engage in regulating development (e.g. through a zoning and subdivision ordinances, building codes) such an affirmative duty, it is believed, exists. Such a process creates an expectation of safety -- "If this were not a safe place to live the government would not have allowed them to build here." The realities, of course, are quite different and in many places and in many ways, government agencies

(especially local governments) commonly permit and approve development in risky places.

Questions about the ethics of the practices of the insurance industry were also identified by interviewees. Especially in California, there was a sense among many that the insurance industry was and is engaging in the practice of "red-lining," or curtailing or stopping the issuance of homeowners insurance in certain areas of high risk exposure. Calvin Wong, of the Oakland planning and building department, described his own difficulty at finding insurance, and the high cost of the premiums. Ted Smith who leads the California hazards mapping program echoed the concerns of many that these maps, once released, would be used by insurance companies to curtail coverage. The source of moral indignation about the behavior of insurance companies to many appears to result from a sense that the industry is unfairly taking advantage of circumstance, and a feeling that companies are operating opportunistically, raising premiums and dropping customers who have had policies for many years. There is a sense that "cherry-picking" --insuring only the safest properties -- is unfair and inequitable, particularly where the same companies are making profits on other types of insurance (e.g. automobile, life) in the same geographic regions. Indeed, this sentiment is behind some of the "coupling" requirements in states like California and Florida (e.g. in California, if a company offers a homeowners policy, it must also offer earthquake insurance).

There is also a feeling, rightly or wrongly, that the current state of natural hazards insurance is at least partly a function of the past practices of insurance companies -- underestimating the chances of major disasters, emphasizing the signing-up of new policyholders over a concern about minimizing or mitigating risks. This feeling is, of course, somewhat at odds with the belief that those who are exposed to risks, ought to be paying much higher rates.

A number of ethical issues have arisen in debate about hazards insurance, and in proposed reforms to state insurance requirements ....(insert discussion of recent Florida proposals?).

Procedural Fairness; Equal Treatment

A number of ethical issues we uncovered had to do with the basic fairness with which people felt treated. A number of "inequities" were identified where similarly-situated individuals were believed not to be treated equally (or where those with important differences in this circumstances were treated equally).

Very often this had to do with mitigation benefits or general disaster assistance received by individuals following a disaster. One of the clearest examples of this can be seen in the aftermath of the Midwest floods, where the buyout program provided essentially the same financial benefits to homeowners who did not have flood insurance as to those

who had been paying flood insurance premiums for as many as twenty years prior to the floods. This did not seem equitable, as might be expected, to those in the latter category. In this way, individuals who were not similarly-situated were unfairly treated equally. A similar problem was seen in the NFIP loophole that allowed homeowners to purchase flood insurance at the last minute, essentially as they saw the flooding progress down the basin. The Flood Insurance Reform Act of 1994, did away with this loophole, increasing the perceived fairness of the law. (3)

Concerns about differences in the treatment of similarly--situated individuals can be identified in a number of recent disaster events. (4) Following Hurricane Hugo, for instance, the permitting process and system resulted in a host of results that were, to many, perverse and unfair. Under the South Carolina Beachfront Management Act (BMA), owners of homes within the so-called "dead zone" (an area twenty feet landward of the dune line) that were damaged 66 2/3 or more were prevented from rebuilding at all in that zone. However, structures with somewhat lesser damage, say 60% were allowed to rebuild (see Beatley, 1990). To add to these concerns of fairness, the South Carolina Coastal Council not only allowed structures less than 66 2/3 damages to rebuild, but allowed these homeowners to raze the existing structure and to erect an entirely new one if they chose to. So, in some areas homeowners experiencing very similar damage levels were treated dramatically differently by the permitting system. One homeowner might have been prevented from rebuilding anything, while her neighbor who also experienced substantial storm damage, might have been permitted to erect an entirely new structure if he chose to.

A similar perversity occurred with respect to rebuilding pools. Under the original BMA, property owners were not permitted to rebuild pools lying within the 40-year setback zone, if they were damaged 50% or greater. The Coastal Council again made a determination that those with pools damaged less than 50% could not only repair them, but could eventually replace them with entirely new pools if they chose to (which apparently often makes more sense economically than spending money on repairs).

Another example cited by FEMA region IX personnel, involved the provision of funds from the minor home repair program following Loma Prieta. Under the program to receive funds a home must be determined to be uninhabitable. Yet, to be classified as uninhabitable might only require that a window be out or the hot water heater not be functioning. These structures are essentially similar to habitable structure but as a result of relatively small damages qualify for federal repair monies.

Examples also emerged of programs that have changed over time, and circumstances where similarly-situated individuals are treated differently depending upon whether they seek benefits (or permits) earlier or later in the recovery process. In Exselsior Springs, the Assistant City Manager there

noted an inequity to propertyowners who were processed early in their buyout program. Individuals towards the end of the program were able to take advantage of additional relocation assistance (to cover the difference between the fair market value of their homes and local replacement costs). As the so-called "Gap" funding become available, neighboring propertyowners might be receiving significantly different buyout payments. (This differential treatment undoubtedly occurred in other towns in Missouri and in the Midwest).

Post-disaster permitting conditions and requirements may also change over time. Those who rebuilt early following the Oakland firestorm had fewer restrictions to deal with. According to the Oakland building department, as more and more reconstruction occurred, and more and more people moved back into the area, public complaints increased and the number of conditions placed on redevelopment grew (e.g. restrictions on the allowable hours of construction, aesthetic complaints about homes, etc.).

There have also been important examples of rules and requirements, again often in the aftermath of a disaster, that have been ignored or inconsistently administered. Following Hurricane Andrew, the substantial improvement requirements of the NFIP, for instance, came under fire, especially in a community called Sago Bay. Under the NFIP, structures damaged greater than 50% are required to be rebuilt according to the current elevation standards. For many homeowners, particularly of older structures built on-grade, this rule imposes substantial expense. The rule has been enforced by FEMA and localities participating in the NFIP for many years, yet following Andrew, a change in the interpretation was sought and gained which essentially eliminated the requirement. Specifically, Dade County was given permission to use a standard of 50% of the replacement cost of a damaged structure (that is, a building would have to be built to the new flood elevation only if the amount of damage exceeded 50% of the cost of a replacement structure). This interpretation essentially meant that the residents of Saga Bay were relieved of compliance with the substantial improvement rule, while many other homeowners before and since Andrew have been required to adhere to it. Similar inconsistences occurred following the Midwest floods.

Another example of inconsistent treatment of individuals, and failure to enforce at least the spirit of a mitigation law, was the prohibition following Hugo of reconstructing or building larger than what was there before the hurricane. Coastal propertyowners discovered, and the S.C. Coastal Council allowed, a way to get around this limitation. Basically, property owners could reconstruct larger homes if they simultaneously requested an approval to build-back what they had before the storm, and an addition to their structures (up to a total of 5,000 square feet in size). (Ironically, this position was defended on grounds of fairness. Because builders of new homes could construct up to 5,000 square feet, it seemed unfair to restrict rebuilding to a lesser size).

Part of the dynamic here is that especially following disaster events, public officials are faced with conflicting sentiments about mitigation rules and requirements. While clear and consistent implementation is one important value, there are also strong pressures loosen or relax standards following a disaster. There is a natural desire to help people who have been devastated by a hurricane or a flood or an earthquake, and to do whatever is possible to allow them to return their lives to a state of normalcy.

Mitigation officials may also see some degree of unfair treatment as an unfortunate evil in exchange for achieving some greater mitigation good. Indeed this seems to be the thinking in defense of the Midwest buy-out program -- that while it is perhaps unfair to extend buy-out benefits to those who have taken no action to protect themselves (and have not purchased flood insurance), the realities are that these people will, without the buy-out program, rebuild in the floodplain, later costing the federal government millions of dollars.

Clearing-out the floodplains of the Midwest, creating safer and less costly settlement patterns, is seen as a greater good that may supersede such concerns about unequal treatment. Of course, it may often be possible to achieve these greater mitigation "goods" without sacrificing fair and equitable treatment. In the case of the Midwest floods, relocation benefits might have been structured in ways which recognized (and rewarded?) past participation in the NFIP, providing a greater level of benefits for these individuals (or lesser benefit levels for those who had not participated).

Another very interesting question of procedural fairness arises in those places, like Pattonsburg, Missouri and Valmeyer, Illinois--midwest towns completely relocated to new sites outside the floodplain-- where officials had to create some sort of system for distributing town home sites. In Pattonsburg, a creative system was developed (without any apparent guidance from outside the community), whereby residents drew lots for time slots --times at which they were allowed to choose a building lot from the town plan. First priority (in drawing) was given to those who were moving their homes to the new town, second priority to those building new homes there. Third priority was given to those with mobile homes. Last priority was given to individuals from outside the community. Valmeyer developed a similar allocation system. While some of the priorities were questioned by citizens (e.g. the owners of mobile homes felt their lifestyle was being looked down upon), the town developed what it perceived as an equitable arrangement for distributing a scarce benefit, in this case town home sites.

Dilemmas in Creative Implementation of Mitigation Programs

In examining the implementation of mitigation programs and policies, it has been striking how much discretion and flexibility and personal interpretation is often involved. 3Program guidance is often sparse or non-existent and mitiga-

tion officials are often put in the position of making personal, sometimes on-the-spot moral judgments about the merits of a particular claim, request or proposal.

How vaguely-defined programs are implemented raises serious ethical dilemmas for program administrators, and certainly also raises concerns about the ethical criteria and principles employed in these judgments, and concerns (again) about the fairness with which people are treated.

Several major examples of this discretion emerged from the case studies. One area of discretion involved the structuring and implementation of local hazard mitigation programs, funded under FEMA's Hazard Mitigation Grants Program (HMGP) (funded under the Stafford Act; see the other working papers in this series). Under this program, often very unique local mitigation measures are proposed, often with little previous experience about the kinds of implementation issues or problems that will be encountered. Many of these programs involve the distribution of monies to homeowners or other individuals to undertake various mitigation measures. As an example, officials in the Region IX office told us of a local program established following the Loma Prieta earthquake to provide financial assistance to homeowners to undertake seismic retrofits during rebuilding. In the course of reviewing specific retrofit applications, FEMA, and its state and local partners, confronted a variety of unanticipated judgment calls about who could and could not receive retrofit funding. Among the key questions that had to be confronted were: Should all residents be eligible or should there be some form of means-testing (the former was decided)? Should individual grants be unlimited or capped at a certain maximum (eventually a cap was instituted after some very large individual retrofits were submitted)? Should homeowners be eligible for retroactive coverage (i.e. reimbursed for retrofit expenditures made before the program was created; the decision was made to allow this)? And, should funding be allowed only for seismic upgrades, and not to repair termite damage, to repair roofs, etc. (a series of very specific guidelines were developed here; for instance, expenditures for things like termite repair, were allowed only where they were directly related to seismic building or bracing).

This particular case illustrates well the discretion and "street-level" mitigation judgments required. While perhaps not often seen as ethical judgments or choices, the resulting implementation guidelines reflect a certain moral content: individuals who did not expect to receive mitigation benefits should not receive them after the fact, no one homeowner should receive a disportionately high benefit, to the potential exclusion of other worthy beneficiaries, and homeowners should receive funding only to cover costs associated with seismic upgrades, the explicit purpose of the program and certainly not to cover non-seismic related home improvements.

Following the Northridge earthquake, similar judgment calls were made in determining which homes were inhabitable

and which were not. While a standardized damaged assessment methodology was used, we heard stories about damage assessors making determinations according to whether or not people would be put out on the street, and whether alternative housing was available from the city, rather than strictly on whether a structure was considered uninhabitable based on the assessment criteria.

In a number of other cases, it has been clear that program administrators in the field are faced with the dilemma of how narrowly to interpret a program or program requirement, or to allow (or promote) creativity in interpretation which allows something positive or appropriate to come about. Do administrators in implementing mitigation programs look to the "letter" of the law, or the "spirit" of the law, or go beyond even both where the outcome is seen as desirable in some important way (e.g. improves the quality of someone's life, reduces long term hazard exposure)?

We encountered a number of examples of differing interpretations of federal and state disaster programs. It was reported to us that following Northridge a decision was made to allow funding for bolting homes to foundations under the minor home repair, because this program provided 100% coverage (compared to the 25% match that would have been required through the IFG--Minimization program), even though, as one FEMA employee critically observed, such an expenditure was not really a minor home repair. The creative program administration in this case was the result of a strong push for seismic mitigation following Northridge, certainly an admirable and important public objective.

The Cost of Mitigation: Trade-offs in the Use of Limited Public Funds

Many of the mitigation dilemmas faced involve tough choices about expending limited mitigation monies. Does mitigation cost too much? This is a frequently asked question and suggests that there are always tradeoffs in where public funds, especially, can be directed.

A number of examples of these tradeoffs emerged in the case studies. In both California and Florida, debate about strengthening public school buildings has been cast in terms of the tradeoffs in the use of limited educational funds. In discussing this issue with a school administrator in Los Angeles, it is clear that additional mandates in non-structural seismic retrofitting (a major concern raised by the Northridge event) are seen as taking away funds that can be spent on school books and other essential school services. ... The debate over the San Francisco URB ordinance, mentioned earlier, was a similar question of cost -- and a concern that the cost would be too high especially for the Chinatown community.

It is not entirely clear that tradeoffs such as these are at all fair or appropriate ones, however. In the case of educational expenditures, to many it seems foolhardy and

unethical to skimp on strengthening school buildings, and the choice between safety and school books is a false one. Both are worthy public expenditures, and ethical governance should find ways to fund both to an adequate level (perhaps the choice is actually to be seen as a tradeoff between seismically-safe schools, adequate books and supplies, etc., and the new baseball stadium, or the tax break for merchants). As well, if ensuring a seismically-safe school is ethically required there may be other viable and appropriate ways to pay for it (see the later section on who should pay). Perhaps users (e.g. families with school-age children) should be assessed a seismic safety surcharge, or the property tax rate raised. Public resources are clearly limited, but the choice that appears ethical is often a function of the way public tradeoffs are structured and presented.

Identifying and Structuring Value Priorities in Mitigation: Public Safety versus Property Protection

Mitigation decisions often involve difficult choices between competing, and sometimes conflicting values. Two values that are frequently involved in mitigation are protection of public health and safety (public safety) and the protection of property and the minimization of the destruction of private property.

We found in the case studies a frequent dialogue and interplay between these two values. When asked which value should be given priority or precedent, the frequent answer is public safety. And, there does appear to be considerable consensus that the protection of public health and safety should take priority. A number of mitigation plans have grappled with this issue and have presented, at least as official policy, the expression of a formal ranking with public safety first.

The issue in practice is somewhat more complex than this, however. One observation is that although public safety is given, in a sense, ethical lip service, it seems that property protection is often a more potent force ....

Clearly, though, protection of human life is the single most important moral value that motivates and guides many of the hazards professionals, and they view as immoral actions or policies that don't place this value at the apex of our societal value structure.

While they do not always or necessarily conflict, public safety and property protection often do. One example encountered in South Florida was the historical practice on the part of many marinas of requiring boatowners to pick-up and trailer-out their boats in advance of an ongoing hurricane or coastal storm. This practice --one intended at protecting private property --serves to add to the evacuation congestion and diminishes the ability to get people quickly out of harms way. Legislation was enacted in Florida in the aftermath of Hurricane Andrew which explicitly addresses this concern, issuing a clear legislative pronouncement that property pro-

tection shall not, at least in the case of boat removal, take priority over life and safety.

Another area of potential conflict, and an interesting area of interplay between the values can be seen in the actions of emergency response personnel who are often asked to risk their own life and safety. The risk that such personnel take is viewed as appropriate especially where the goal is to save the lives of others. But often such personnel are placed in situations where they are risking their lives to save someone's residence or business. In the Oakland firestorm, for instance, a number of firemen lost their lives essentially fighting property destruction (though certainly public safety was also involved).

Of course, there is often not a simple sorting-out of these values and public safety and property protection often go hand in hand. (The Oakland firestorm was clearly also a major threat to human life.) The question remains whether and to what extent protection of property justifies placing the lives of others in jeopardy.

The public safety-property protection issue has emerged as a significant question in California with respect to the seismic safety provided by building codes. Protection of human life has historically been the primary goal behind such codes. Such codes are intended primarily to ensure that buildings are "survivable" -- that is, when an earthquake occurs, people will be able to leave the buildings alive. Yet many have interpreted (including many building owners) that seismic codes will protect property as well -- that is, that if the building is constructed to codes, it will survive an earthquake event and will be economically functional following the event. This is a mis-impression, however.